Colour television

Chassis

MD 2.21 E
2.22 E
2.23 E
AA

Service
Service
Service

Service Manual

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PCS 91 143 GB

Mechanical instructions

Removing the small panels out of brackets clicked on the SSP bracket

To dismount the panels itself which are mounted in the brackets clicked on the SSP bracket, the following has to be done:

- Upper panel; Open click 14 and 15 and take out the panel mounted in the upper bracket. Lay the panel on a table.
- Lower panel; Open click 16 and 17 and take out the panel mounted in the lower bracket. Lay the panel on a table.

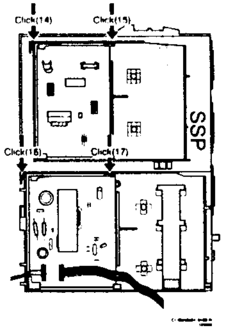


Fig. 4.6

Two possibilities:

Service position bracket including panels:

1. Remove the fixing bracket by means of its clicks.
2. Remove the subwoofer so that a place is created to be able to remove the module directly.
3. Push both clicks (18 + 19), which secure the large bracket to the bottom plate, upwards at the same time.
4. Pull the entire module to the back while the clicks are being held up.
5. Remove the entire bracket, including the modules, from the bottom plate.
6. Lay the entire module with the modules, pointing upwards, on the bottom plate.

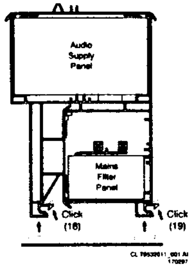


Fig. 4.7

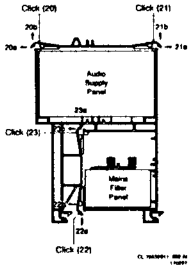


Fig. 4.8

Service position of the 'Audio Power Supply' or the 'Mains Filter' itself:

1. Leave the large bracket in its vertical position, but remove the fixing bracket between the large bracket and the subwoofer.
2. Click the large clicks on the large bracket free.
   - ★ For the 'Audio Power Supply' the two large clicks (20 + 21) on the top.
   - ★ For the 'Mains Filter' the large click on the bottom left (22) and then the small click halfway on the left (23).
3. Remove the wiring from its clamps.
4. The module can now be removed from the bracket and placed on a table.
5. During assembly make sure that the module is re-clamped correctly BEHIND its grip.

Service position VGA interface panel in the 28"

1. Carefully remove the entire bottom plate including LSP and SSP from the cabinet and place it a few centimetres to the rear (watch out for the picture tube panel).
2. Pull the wiring loose to the front.
3. Click the VGA interface panel free.

Service position front operation

In sets with front operation (FL5 styling), knobs and LED's are located under the picture tube. All front panels and centre loudspeakers are mounted in a plastic bracket which can be removed in its entirety.

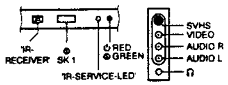
1. In order to be able to remove the bracket, the screws between the picture tube and the bottom plate on the inside of the cabinet are to be removed together with the screws which are located on the bottom of the cabinet. In order to be able to remove these screws easily the set will have to be turned. It is preferred that the set is turned with the back cover fitted.Turn the set so that the picture tube is pointing down and place the set carefully onto a soft and clean surface.
2. After the screws have been removed the set can be brought back to the normal position.
3. After removing the screws on the inside, the bracket can be removed via the bottom.

1. Technical specifications

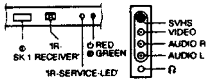
Mains voltage	: 220 - 240 V (± 10%) : 50 Hz - 60 Hz (± 5%)
Aerial input impedance	: 75 Ω - koaxial
Minimum aerial voltage	: 30 μV (VHF), 40 μV (UHF)
Maximum aerial voltage VHF/S/UHF	: 180 mV
Programmes	: 0 - 99
VCR programmes	: 0, 50 - 99

2. Connection facilities

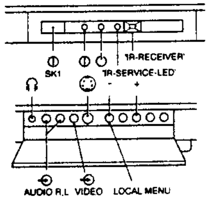
TOP CONTROL
STYLING MIDDLE (FL6A)

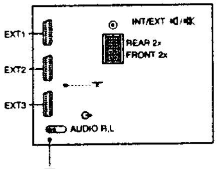

'IR-RECEIVER'
SK 1
RED
GREEN
'IR-SERVICE-LED'
SVHS
VIDEO
AUDIO R
AUDIO L
Ω

TOP CONTROL
STYLING RIGHT (FL6B)


SK 1
'IR-RECEIVER'
RED
GREEN
'IR-SERVICE-LED'
SVHS
VIDEO
AUDIO R
AUDIO L
Ω

TOP CONTROL
STYLING (FL5)

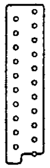

SK1
'IR-RECEIVER'
'IR-SERVICE-LED'
-
+
AUDIO R.L
VIDEO
LOCAL MENU


EXT1
EXT2
EXT3
INT/EXT
REAR 2x
FRONT 2x
AUDIO R.L

CL 76532013_005.AI
200297

Specification of the connectors

EXT 1 (AUX): RGB+CVBS



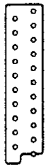
1 - Audio ○→ R ($0.5V_{RMS}$ ≤ 1kΩ)
2 - Audio →○ R ($0.5V_{RMS}$ ≥ 10kΩ)
3 - Audio ○→ L ($0.5V_{RMS}$ ≤ 1kΩ)
4 - Audio ⊥
5 - Blue ⊥
6 - Audio →○ L ($0.5V_{RMS}$ ≥ 10kΩ)
7 - Blue ($0.7V_{pp}$/75Ω)
8 - CVBS-status →○
0-1.3V: INT
4.5-7V: EXT 16:9
9.5-12V: EXT 4:3
9 - Green ⊥
10 - -
11 - Green ($0.7V_{pp}$/75Ω)
12 - -
13 - Red ⊥
14 - RGB-status ⊥
15 - Red ($0.7V_{pp}$/75Ω)
16 - RGB-status
(0-0.4V: INT)
(1-3V: EXT/75Ω)
17 - CVBS ⊥
18 - CVBS ⊥
19 - CVBS ○→ ($1V_{pp}$/75Ω)
20 - CVBS →○ ($1V_{pp}$/75Ω)
21 - Earthscreen

Front

◎ CINCH Video →○ $1V_{pp}$/75Ω
◎ CINCH Audio →○ L ($2V_{RMS}$; ≥ 10kΩ)
◎ CINCH Audio →○ R ($2V_{RMS}$; ≥ 10kΩ)

◉ 3.5mm 🔈/🎧 32-2000Ω ≥ 10mW

EXT2 (VCR): SVHS+CVBS+RGB

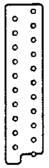


1 - Audio ○→ R ($0.5V_{RMS}$ ≤ 1kΩ)
2 - Audio →○ R ($0.5V_{RMS}$ ≥ 10kΩ)
3 - Audio ○→ L ($0.5V_{RMS}$ ≤ 1kΩ)
4 - Audio ⊥
5 - Blue ⊥
6 - Audio →○ L ($0.5V_{RMS}$ ≥ 10kΩ)
7 - Blue ($0.7V_{pp}$/75Ω)/C-out
(project 50)
8 - CVBS-status →○
0-1.3V: int
4.5-7V: EXT 16:9
9.5-12V: EXT 4:3
9 - Green ⊥
10 - Control (project 50)
11 - Green ($0.7V_{pp}$/75Ω)
12 - -
13 - Red ⊥
14 - RGB-status ⊥
15 - Red ($0.7V_{pp}$/75Ω), C-in/out
16 - RGB-status
(0-0.4V: INT)
(1-3V: EXT/75Ω)
17 - CVBS ⊥
18 - CVBS ⊥
19 - CVBS/Y ○→ ($1V_{pp}$/75Ω)
20 - CVBS/Y →○ ($1V_{pp}$/75Ω)
21 - Earthscreen

SVHS

1 - ⊥
2 - ⊥
3 - Y →○ ($1V_{pp}$; 75Ω)
4 - C →○ ($0.3V_{pp}$; 75Ω)

EXT3: CVBS+audio



1 - -
2 - Audio →○ R ($0.5V_{RMS}$ ≥ 10kΩ)
3 - -
4 - Audio ⊥
5 - -
6 - Audio →○ L ($0.5V_{RMS}$ ≥ 10kΩ)
7 - -
8 - -
9 - -
10 - -
11 - -
12 - -
13 - -
14 - -
15 - -
16 - -
17 - CVBS ⊥
18 - CVBS ⊥
19 - -
20 - CVBS →○ ($1V_{pp}$/75Ω)
21 - Earthscreen

Audio out (rear)

◎ CINCH Audio ○→ L ($0.5V_{RMS}$; ≤ 1kΩ)
◎ CINCH Audio ○→ R ($0.5V_{RMS}$; ≤ 1kΩ)

3. Safety instructions, Maintenance instructions, Warnings and Notes

Safety instructions for repairs

1. Safety regulations require that during a repair:
   - the set should be connected to the mains via an isolating transformer
   - safety components, indicated by the symbol ▲ should be replaced by components identical to the original ones
   - when replacing the CRT, safety goggles must be worn

2. Safety regulations require that after a repair the set must be returned in its original condition. In particular attention should be paid to the following points:
   - As a strict precaution, we advise you to resolder the solder joints through which the horizontal deflection current is flowing, in particular:
     - all pins of the line output transformer (LOT);
     - fly-back capacitor(s);
     - S-correction capacitor(s);
     - line output transistor;
     - pins of the connector with wires to the deflection coil;
     - other components through which the deflection current flows.

   Note:
   This resoldering is advised to prevent bad connections due to metal fatigue in solder joints and is therefore only necessary for television sets older than 2 years.
   - The wire trees and EHT cable should be routed correctly and fixed with the mounted cable clamps.
   - The insulation of the mains lead should be checked for external damage.
   - The mains lead strain relief should be checked for its function in order to avoid touching the CRT, hot components or heat sinks.
   - The electrical DC resistance between the mains plug and the secondary side should be checked (only for sets which have a mains isolated power supply). This check can be done as follows:
     - unplug the mains cord and connect a wire between the two pins of the mains plug;
     - set the mains switch to the on position (keep the mains cord unplugged!);
     - measure the resistance value between the pins of the mains plug and the metal shielding of the tuner or the aerial connection on the set. The reading should be between 4.5 MΩ and 12 MΩ;
     - switch off the TV and remove the wire between the two pins of the mains plug.
   - The cabinet should be checked for defects to avoid touching of any inner parts by the customer.

Maintenance instruction

It is recommended to have a maintenance inspection carried out by a qualified service employee. The interval depends on the usage conditions:

- when the set is used under normal circumstances, for example in a living room, the recommended interval is 3 to 5 years;
- when the set is used in circumstances with higher dust, grease or moisture levels, for example in a kitchen, the recommended interval is 1 year.

The maintenance inspection contains the following actions:

- execute the above mentioned 'general repair instruction';
- clean the power supply and deflection circuitry on the chassis;
- clean the picture tube panel and the neck of the picture tube.

Warnings

1. In order to prevent damage to ICs and transistors, all high-voltage flashovers must be avoided. In order to prevent damage to the picture tube, the method shown in Fig. 3.1 should be used to discharge the picture tube. Use a high-voltage probe and a multimeter (position DC-V). Discharge until the meter reading is 0V (after approx. 30s).

2. **ESD** ⚠

   All ICs and many other semiconductors are sensitive to electrostatic discharges (ESD). Careless handling during repair can drastically shorten the life. Make sure that during repair you are connected by a pulse band with resistance to the same potential as the earth ot the unit. Keep components and tools also at this same potential.

3. Together with the deflection unit and any multipole unit, the flat square picture tubes used form an integrated unit. The deflection and the multipole units are set optimally at the factory. Adjustment of this unit during repair is therefore not recommended.

4. Be careful when taking measurements in the high-voltage section and on the picture tube.

5. Never replace modules or other components while the unit is switched on.

6. When making settings, use plastic rather than metal tools. This will prevent any short circuits and the danger of a circuit becoming unstable.

7. On this unit the 141 volt supply voltage is not supplied via an interconnection on the deflection yoke to the line output transformer. Whenthe deflection cable is detached, the + 141 volt supply remeins loaded. In orderto unload the + 141 volts, coil 5136 should be removed.

Notes

1. The direct voltages and oscillograms should be measured with regard to the tuner earth (⊥), or hot earth (⊥ϟ) as this is called.

2. The direct voltages and oscillograms shown in the diagrams should be measured in the **Service Default Mode** (see chapter 6) with a colour bar signal and stereo sound (L: 3 kHz, R: 1 kHz unless stated otherwise) and picture carrier at 475.25 MHz.

3. Where necessary, the oscillograms and direct voltages are measured with (⊤) and without aerial signal (⨯). Voltages in the power supply section are measured both for normal operation (⏼) and in standby (⏻). These values are indicated by means of the appropriate symbols.

4. The picture tube PWB has printed spark gaps. Each spark gap is connected between an electrode of the picture tube and the Aquadag coating.

5. The semiconductors indicated in the circuit diagram and in the parts lists are completely interchangeable per position with the semiconductors in the unit, irrespective of the type indication on these semiconductors.

6. DD DOLBY SURROUND
   PRO • LOGIC

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   DOLBY, the double-D symbol DD and PRO LOGIC are trademarks of Dolby Laboratories Licensing Corporation.

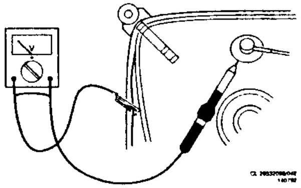
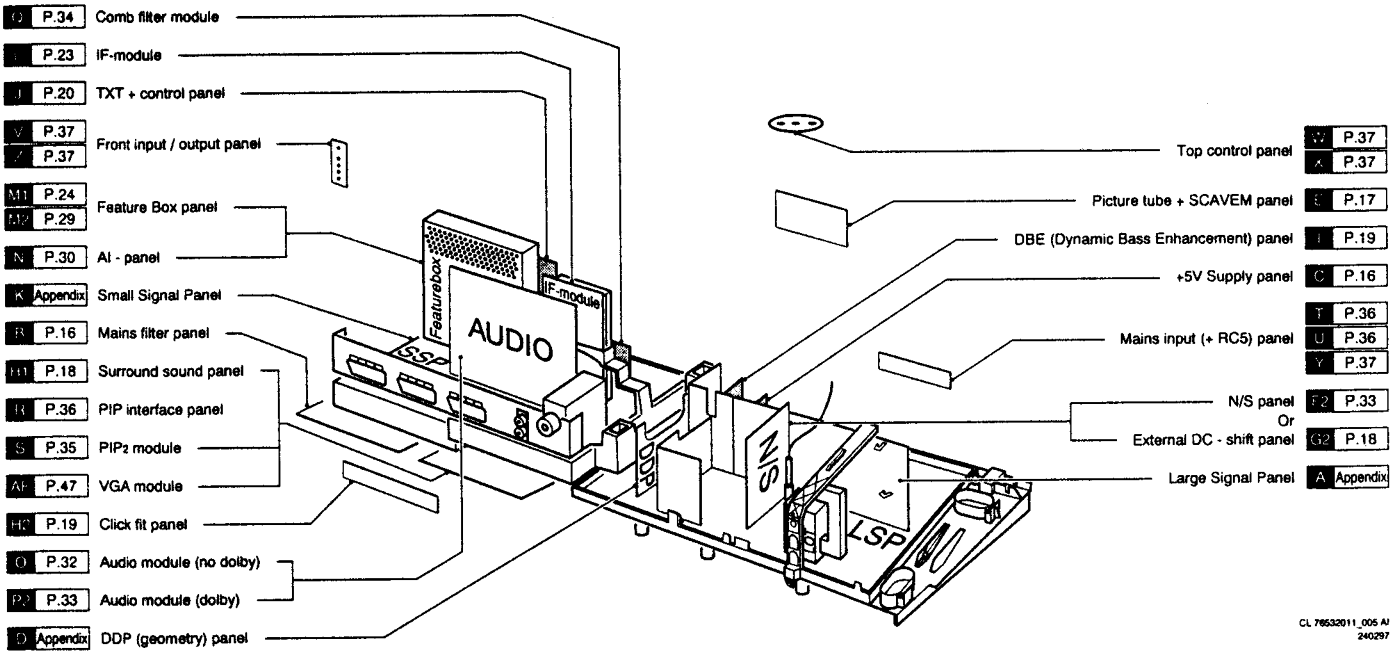


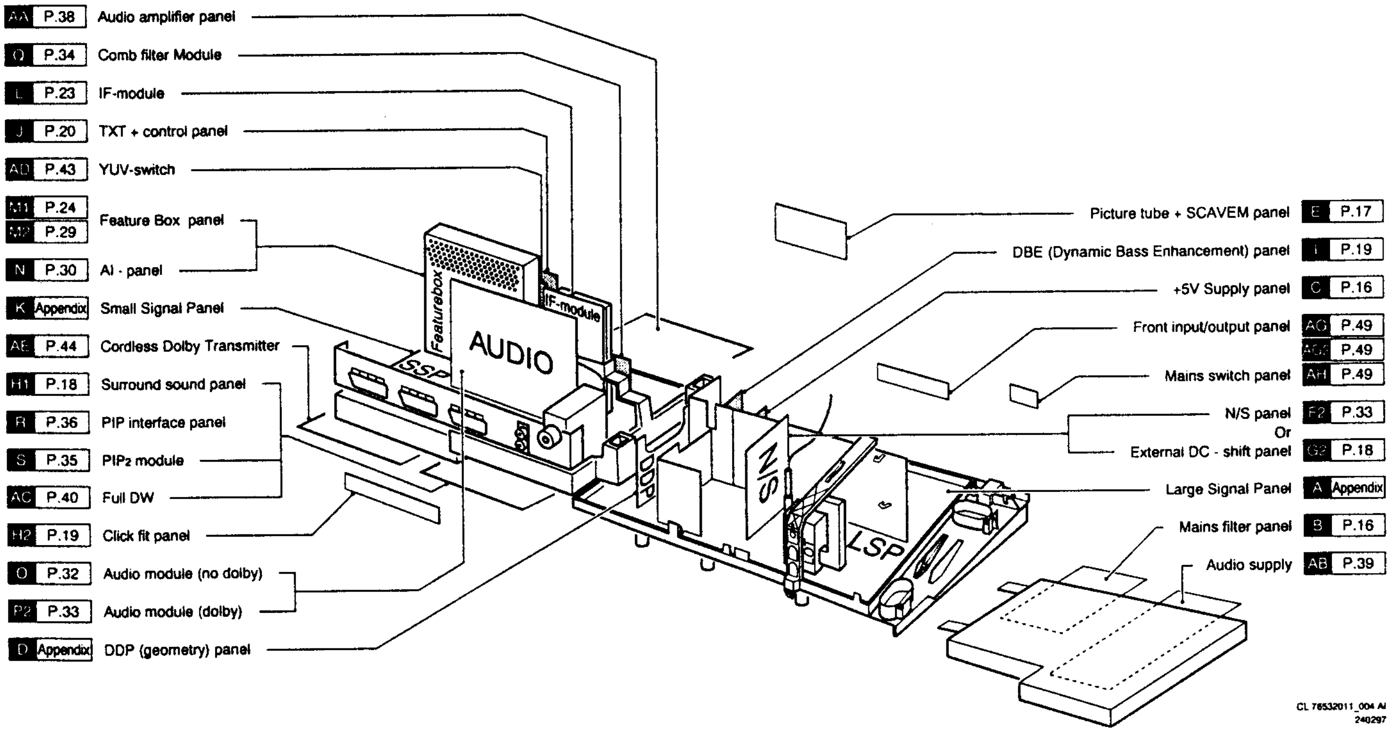
Fig. 3.1

Chassis overview

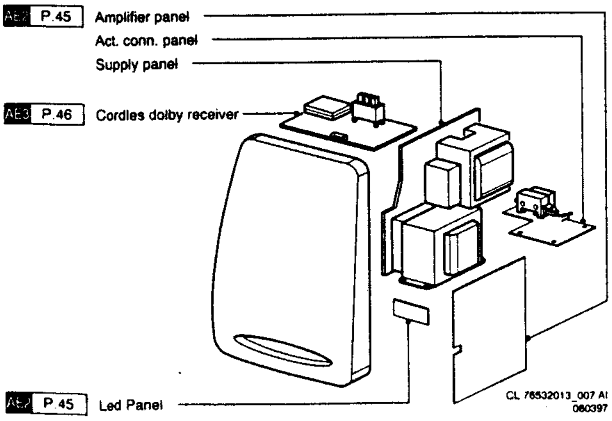
Non Top Dolby version


Q P.34 Comb filter module
L P.23 IF-module
J P.20 TXT + control panel
V P.37
Z P.37 Front input / output panel
M1 P.24
M2 P.29 Feature Box panel
N P.30 AI - panel
K Appendix Small Signal Panel
B P.16 Mains filter panel
H1 P.18 Surround sound panel
R P.36 PIP interface panel
S P.35 PIP2 module
AF P.47 VGA module
H2 P.19 Click fit panel
O P.32 Audio module (no dolby)
P2 P.33 Audio module (dolby)
D Appendix DDP (geometry) panel
Top control panel W P.37
X P.37
Picture tube + SCAVEM panel E P.17
DBE (Dynamic Bass Enhancement) panel F P.19
+5V Supply panel C P.16
T P.36
Mains input (+ RC5) panel U P.36
Y P.37
N/S panel F2 P.33
Or
External DC - shift panel G2 P.18
Large Signal Panel A Appendix
Featurebox
IF-module
AUDIO
SSP
DDP
N/S
LSP
CL 76532011_005 AI
240297

Top Dolby version


AA P.38 Audio amplifier panel
Q P.34 Comb filter Module
L P.23 IF-module
J P.20 TXT + control panel
AD P.43 YUV-switch
M1 P.24
M2 P.29 Feature Box panel
N P.30 AI - panel
K Appendix Small Signal Panel
AE P.44 Cordless Dolby Transmitter
H1 P.18 Surround sound panel
R P.36 PIP interface panel
S P.35 PIP2 module
AC P.40 Full DW
H2 P.19 Click fit panel
O P.32 Audio module (no dolby)
P2 P.33 Audio module (dolby)
D Appendix DDP (geometry) panel
Picture tube + SCAVEM panel E P.17
DBE (Dynamic Bass Enhancement) panel F P.19
+5V Supply panel C P.16
Front input/output panel AG P.49
AG2 P.49
Mains switch panel AH P.49
N/S panel F2 P.33
Or
External DC - shift panel G2 P.18
Large Signal Panel A Appendix
Mains filter panel B P.16
Audio supply AB P.39
Featurebox
IF-module
AUDIO
SSP
DDP
N/S
LSP
CL 76532011_004 AI
240297

Cordless Dolby Receiver


AE2 P.45 Amplifier panel
Act. conn. panel
Supply panel
AE3 P.46 Cordles dolby receiver
AE2 P.45 Led Panel
CL 76532013_007 AI
060397

4. Mechanical instructions

The MD2 chassis has predefined service positions for different panels. To get access to the chassis, first do the following steps:

1. Unscrew the 4 screws fixing the rear cover to the rear cover plate (cover plate with the scart plugs).
2. Unclick the 4 clicks at the top side and upper left and right side by pushing (no torquing is required) the clicks while pushing the rear cover a little.
3. Unscrew the remaining 4 screws.
4. Take of the rear cover.

Service position LSP component side

1. Remove the subwoofer by disconnecting the cable and lift it.
2. Put the SSP in the horizontal service position (see horizontal service position SSP) or the 30 degree position.
3. Remove the screw (1) in the bracket of the LOT. Remove this bracket by pushing the click (2) en pull it upwards.
4. Release clicks (3) and (4).
5. Lift the LSP PWB out of its bracket and pull it a little back.

   PS: After taking out the mains cord from its fixation clicks, the entire bottom plate with the chassis in it can be released from the cabinet and then shifted back to create more space.

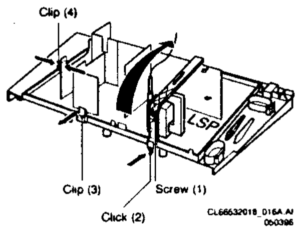


Fig. 4.1

Service position LSP copper side

Two possibilities:

With a table:

1. Bring the LSP in the service position component side (see above).
2. Take all wiring out of the fixation brackets (on the rear side of the chassis and under the picture tube).
3. Dismount the mains input panel from the SSP bracket and lay it on the table (this gives more freedom of the mains cable N01-L01).
4. Disconnect the degaussing coil (connector L02).
5. Disconnect the rotation coil (connector Y90) if fitted.
6. Carefully pull back the LSP and put it on its front side.

Without a table by making use of cable extension kit 4822 310 10674:

1. Disconnect all cables at the LSP side.
2. By now the LSP can be turned to a vertical position (5), copper side at the right hand with the LOT above. For this vertical position special slides are made in the bottom plate of the cabinet.
3. The LSP can be fixed to the bottom plate by using the special pin marked M2. This pin is part of the bottom plate and must be broken out and placed into the hole (6) in the bottom plate.
4. Now reconnect L11-S11, L15-S15, L10-S10 and L01-N01 by **replacing** the cables by the cables of the cable extension kit 4822 310 10674.
5. By now the video processing is totally reconnected.
6. In case audio reproduction is required:
   For non-dolby sets:
   - Reconnect the Audio Module to the audio amplifier on the LSP (I28-L28).
   - Disconnect the plug at the left speaker side (seen from the rear).
   - Reconnect the green connector L38 (now the right speaker (seen from the rear) is connected).

   For dolby sets the centre speaker can be used or the Left and Right speaker by connecting this cable to V32 on the Surround Sound panel.

   Remark: Leave the special pin in the special hole on the bottom plate of the set after the repair.

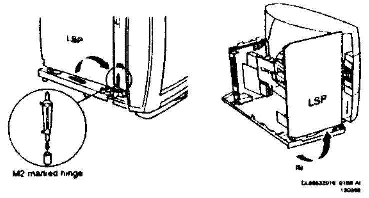


Fig. 4.2

Vertical service position SSP (solder side)

1. To reach for the SSP first the plastic rear cover plate (7) must be removed by putting a screwdriver in the hole (8) and move it upwards. Now the rear cover plate can be removed by lifting it in the direction of the arrow.
2. To have access to the copper side of the SSP, the brackets clicked on the left side (seen from the back) from the SSP bracket must be removed:
   - Upper bracket; Pushing the click (9) away and slide the bracket according the arrow upwards.
   - Lower bracket; First dismount the upper bracket, then push click (10) away and pulling it upwards according the arrow.

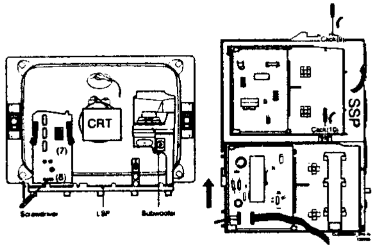


Fig. 4.3

Horizontal service position SSP (component side)

1. Push down the clicks of the SSP bracket (11) and simultaneously shift the complete SSP bracket including panels to the left (seen from the rear).
2. Take the SSP bracket (including all panels) out of the bottom plate and shift it a little to the right (seen from the side).
3. Put the SSP-bracket in the special holes on the bottom plate.
4. Now the SSP component side and all the panels mounted on the SSP are accessible.

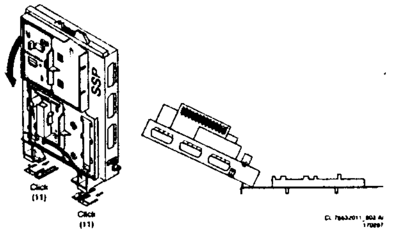


Fig. 4.4

Extra service position SSP for front operation (FL5)

1. Push the clicks of the SSP bracket down and at the same time slide the entire SSP bracket, including the panels, to the left (viewed from the rear)
2. Where necessary remove the wiring from its clicks
3. Tilt the SSP bracket (with all panels) into its 30 degree position

This 'extra' service position for the SSP bracket can be used in all MD2.2 sets.

Service position Feature Box by using cable extension kit 4822 310 10674

With the use of the same extension kit as used for the vertical LSP service position, the Feature Box can be placed away from the SSP.

1. Put the SSP in the horizontal service position.
2. Remove the fixation bracket which holds the feature box and the IF-module by unscrewing the 2 screws (12) and then take out the fixation bracket. Take care for the 2 clicks of this bracket clicked in the feature Box shielding.
3. Click out the Feature Box and connect it to the SSP making use of the cable extension kit 4822 310 10674.

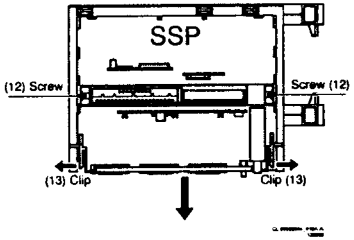
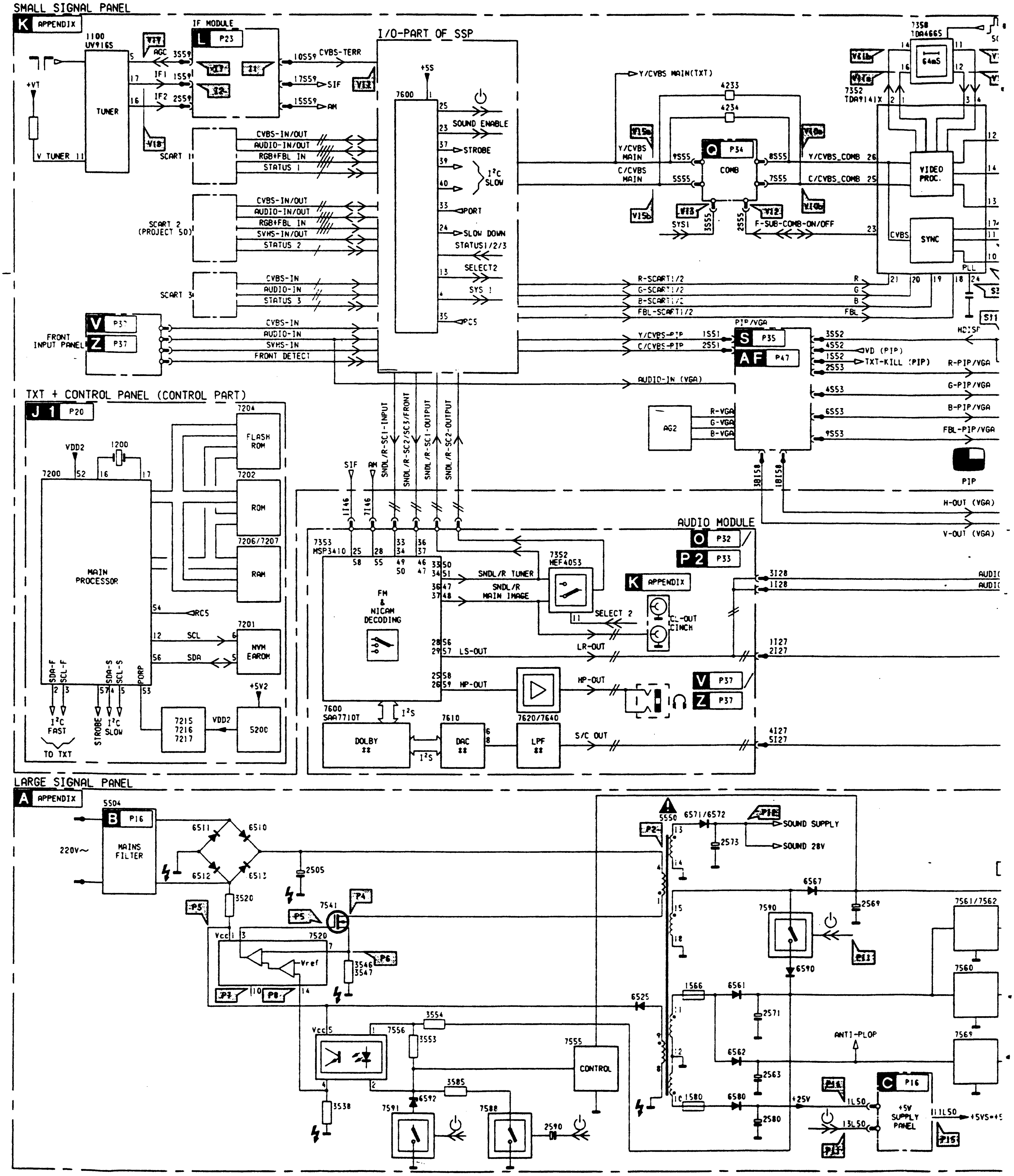


Fig. 4.5

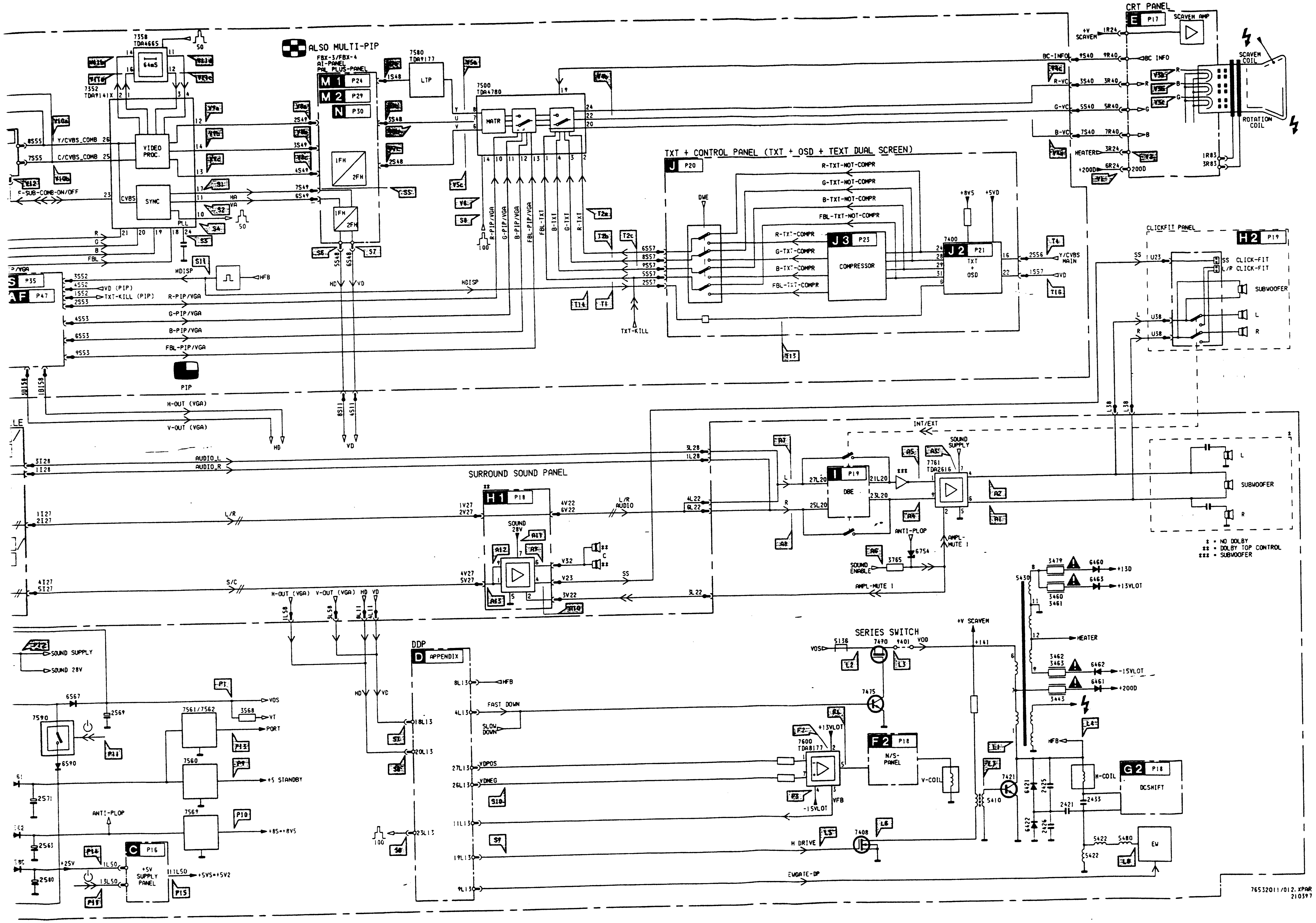
Service position SSP PWB

First remove all cables where needed. Then remove the screws (12) in the bracket. The SSP PWB can be removed after loosing the two clicks (13), then slided backwards (in the direction of the arrow on the SSP bracket) and then taken out of the bracket.

Block diagram non-Top-Dolby version /

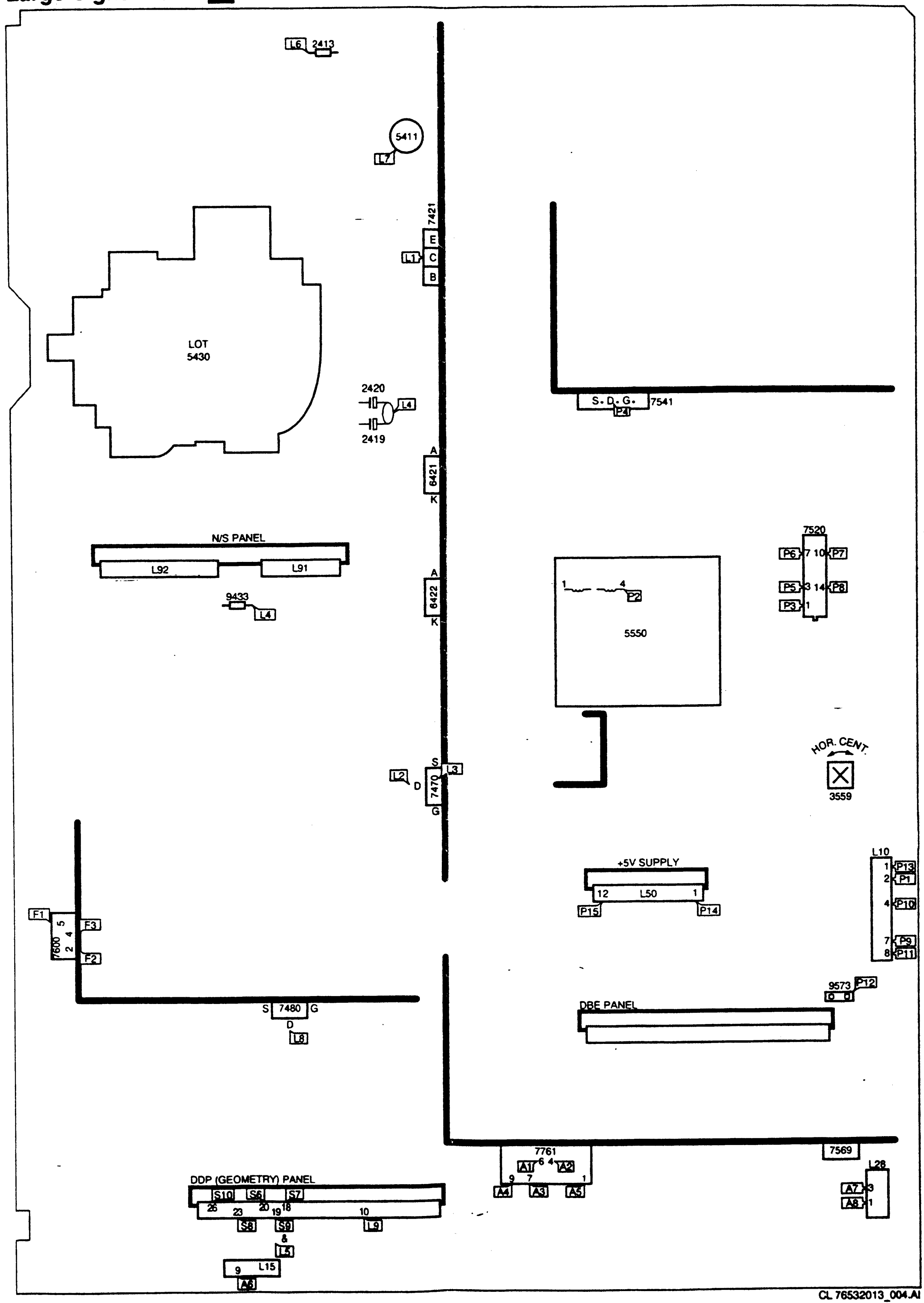

SMALL SIGNAL PANEL
K APPENDIX
1100 UV916S
TUNER
V TUNER
+VT
AGC
IF1
IF2
IF MODULE
L P23
CVBS-TERR
SIF
AM
SCART 1
CVBS-IN/OUT
AUDIO-IN/OUT
RGB+FBL IN
STATUS 1
SCART 2 (PROJECT 50)
SVHS-IN/OUT
STATUS 2
SCART 3
CVBS-IN
AUDIO-IN
STATUS 3
FRONT INPUT PANEL
V P37
Z P37
SVHS-IN
FRONT DETECT
I/O-PART OF SSP
7600
+5S
SOUND ENABLE
STROBE
I²C SLOW
PORT
SLOW DOWN
STATUS1/2/3
SELECT2
SYS 1
PCS
Y/CVBS MAIN(TXT)
4233
4234
Y/CVBS MAIN
C/CVBS MAIN
Q P34
COMB
Y/CVBS_COMB
C/CVBS_COMB
SYS1
F-SUB-COMB-ON/OFF
7350 TDA4665
64mS
7352 TDA9141X
VIDEO PROC.
SYNC
CVBS
PLL
R-SCART1/2
G-SCART1/2
B-SCART1/2
FBL-SCART1/2
PIP/VGA
Y/CVBS-PIP
C/CVBS-PIP
S P35
AF P47
VD (PIP)
TXT-KILL (PIP)
R-PIP/VGA
G-PIP/VGA
B-PIP/VGA
FBL-PIP/VGA
AUDIO-IN (VGA)
AG2
R-VGA
G-VGA
B-VGA
PIP
H-OUT (VGA)
V-OUT (VGA)
TXT + CONTROL PANEL (CONTROL PART)
J 1 P20
VDD2
1200
7200
7204 FLASH ROM
7202 ROM
7206/7207 RAM
MAIN PROCESSOR
RC5
7201 NVM EAROM
SCL
SDA
+5V2
5200
7215 7216 7217
SDA-F SCL-F
SDA-S SCL-S
PORP
I²C FAST
TO TXT
STROBE
I²C SLOW
SNDL/R-SC1-INPUT
SNDL/R-SC2/SC3/FRONT
SNDL/R-SC1-OUTPUT
SNDL/R-SC2-OUTPUT
AUDIO MODULE
O P32
P 2 P33
7353 MSP3410
FM & NICAM DECODING
7352 HEF4053
SNDL/R TUNER
SNDL/R MAIN IMAGE
K APPENDIX
SELECT 2
CL-OUT CINCH
LS-OUT
LR-OUT
HP-OUT
7620/7640
7600 SAA7710T
I²S
DOLBY
7610 DAC
LPF
S/C OUT
AUDIO
LARGE SIGNAL PANEL
A APPENDIX
5504
B P16
MAINS FILTER
220V~
6510 6511 6512 6513
2505
3520
7541
7520
Vref
3546 3547
5550
6571/6572
SOUND SUPPLY
SOUND 28V
2573
6567
2569
7590
6590
7561/7562
7560
7569
6525
1566
6561
2571
ANTI-PLOP
6562
2563
1580
6580
2580
+25V
C P16
+5V SUPPLY PANEL
+5VS
3554
7556
3553
7555 CONTROL
3585
6592
3538
7591
7588
2590

Blockschaltbild nicht Top-Dolby-Version / Diagramme synoptique version non Top-Dolby


ALSO MULTI-PIP
FBX-3/FBX-4
AI-PANEL
PAL PLUS-PANEL
M1 P24
M2 P29
N P30
7358 TDA4665
7352 TDA9141X
VIDEO PROC.
SYNC
PLL
7580 TDA9177
LTP
7500 TDA4780
MATR
CRT PANEL
E P17
SCAVEM AMP
BC INFO
SCAVEM COIL
ROTATION COIL
HEATER
TXT + CONTROL PANEL (TXT + OSD + TEXT DUAL SCREEN)
J P20
J3 P23
COMPRESSOR
J2 P21
TXT + OSD
R-TXT-NOT-COMPR
G-TXT-NOT-COMPR
B-TXT-NOT-COMPR
FBL-TXT-NOT-COMPR
R-PIP/VGA
G-PIP/VGA
B-PIP/VGA
FBL-PIP/VGA
TXT-KILL
PIP
H-OUT (VGA)
V-OUT (VGA)
CLICKFIT PANEL
H2 P19
SS CLICK-FIT
L/R CLICK-FIT
SUBWOOFER
AUDIO_L
AUDIO_R
SURROUND SOUND PANEL
H1 P18
SOUND 28V
INT/EXT
I P19
DBE
SOUND SUPPLY
7761 TDA2616
ANTI-PLOP
AMPL-MUTE 1
SOUND ENABLE
* = NO DOLBY
** = DOLBY TOP CONTROL
*** = SUBWOOFER
SOUND SUPPLY
SOUND 28V
7590
7561/7562
7560
7569
+5 STANDBY
C P16
+5V SUPPLY PANEL
DDP
D APPENDIX
FAST DOWN
SLOW DOWN
SERIES SWITCH
7600 TDA8177
F2 P18
N/S-PANEL
V-COIL
H DRIVE
EWGATE-DP
H-COIL
G2 P18
DCSHIFT
EW
HEATER
+13D
+13VLOT
-15VLOT
+200D
76532011/012.XPAR 210397

Survey of testpoints / Übersicht der Meßpunkte / MD 2.21/2.22/2.23 7 Liste des points de test

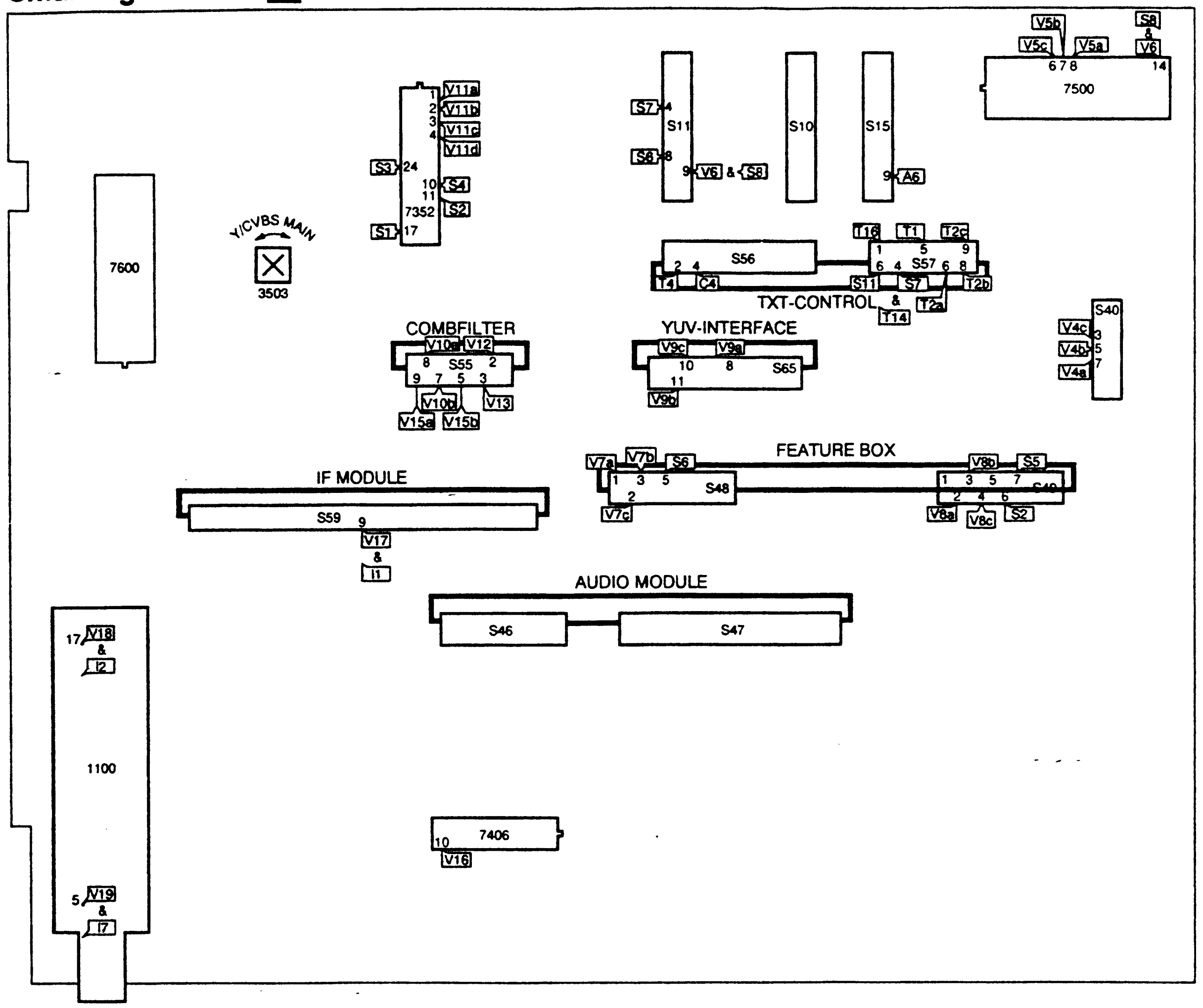
Large Signal Panel A



LOT 5430
5411
7421
6421
6422
7470
N/S PANEL
L92
L91
9433
7541
S - D - G
7520
5550
HOR. CENT.
3559
2420
2419
7600
7480
+5V SUPPLY
L50
DBE PANEL
9573
L10
7761
7569
L28
DDP (GEOMETRY) PANEL
L15

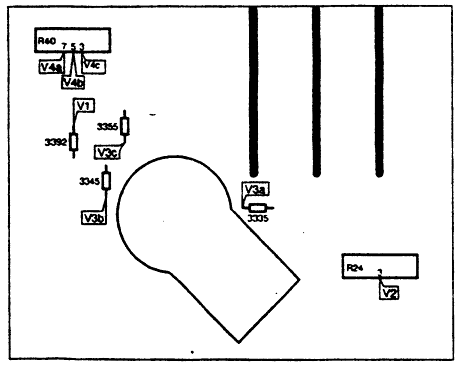
CL 76532013_004.AI
190297

Small Signal Panel K



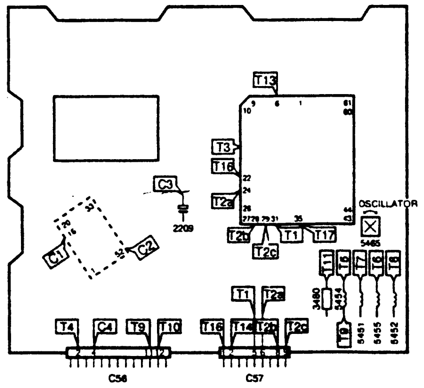
7500
7600
Y/CVBS MAIN
3503
7352
S11
S10
S15
S56
S57
TXT-CONTROL
COMBFILTER
S55
YUV-INTERFACE
S65
S40
IF MODULE
S59
FEATURE BOX
S48
S49
AUDIO MODULE
S46
S47
1100
7406

Picture Tube Panel E



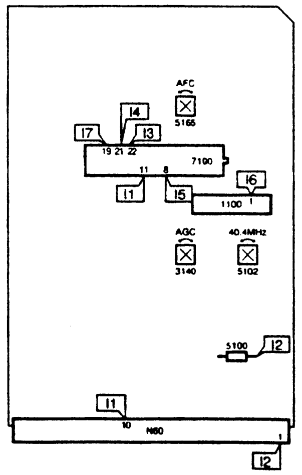
3392
3355
3345
3335

TXT & Control Panel J



2209
OSCILLATOR
5465
C56
C57

IF-Module L



AFC
5165
7190
1100
AGC
3140
40.4MHz
3102
5100

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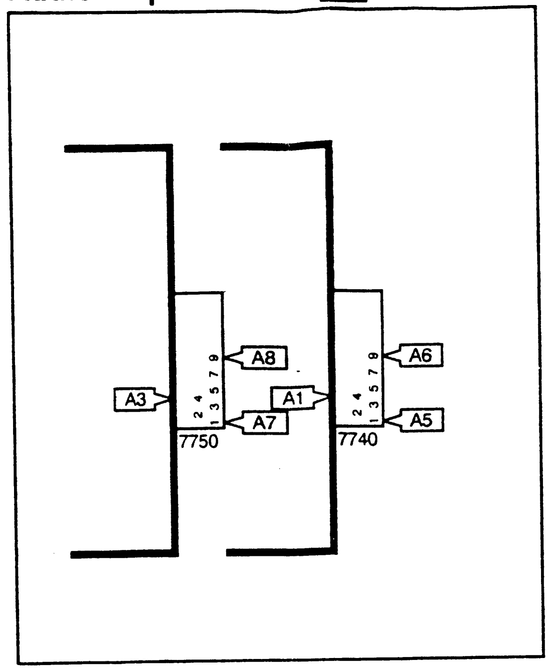
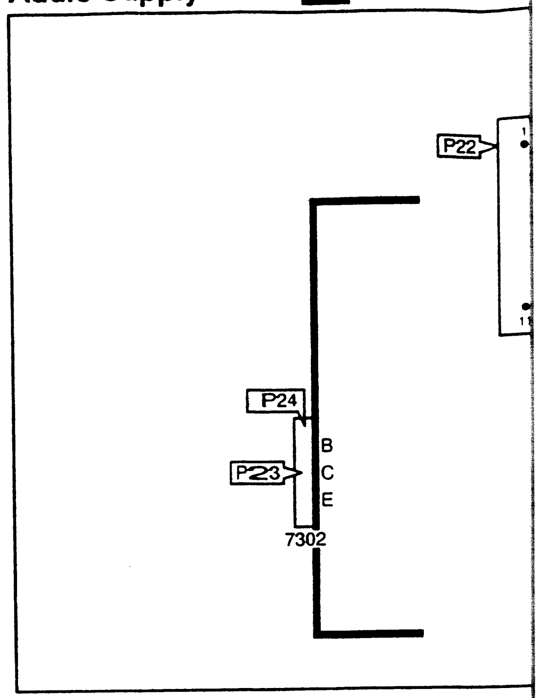
190297

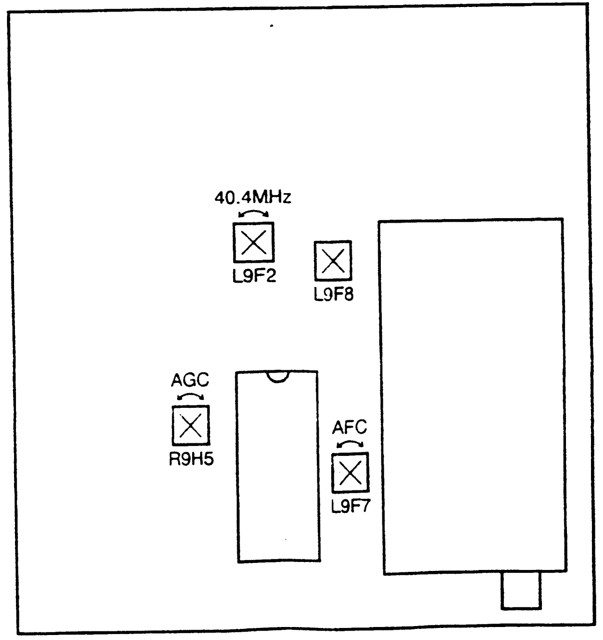
Audio Amplifier Panel AA


A3
A8
A7
A1
A6
A5
1 3 5 7 9
2 4
7750
7740

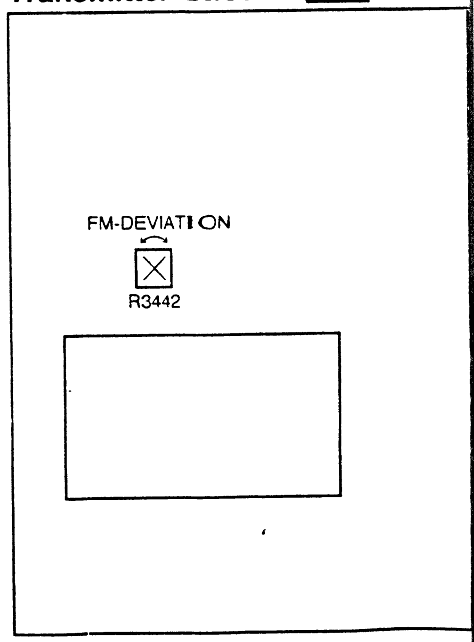
Audio Supply Panel AB


P22
P24
P23
B
C
E
7302

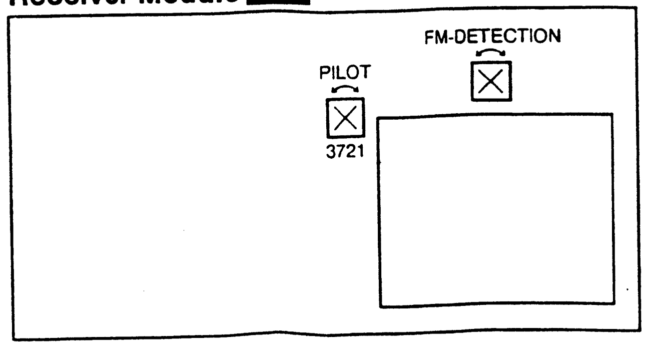
Video Dual Screen Module AC


40.4MHz
L9F2
L9F8
AGC
R9H5
AFC
L9F7

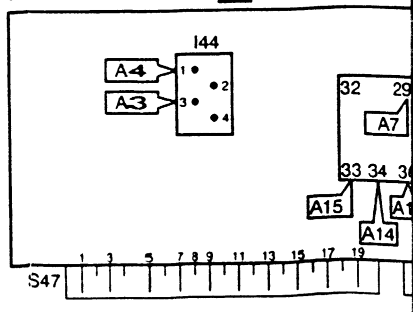
Cordless Dolby Transmitter Module AE1


FM-DEVIATION
R3442

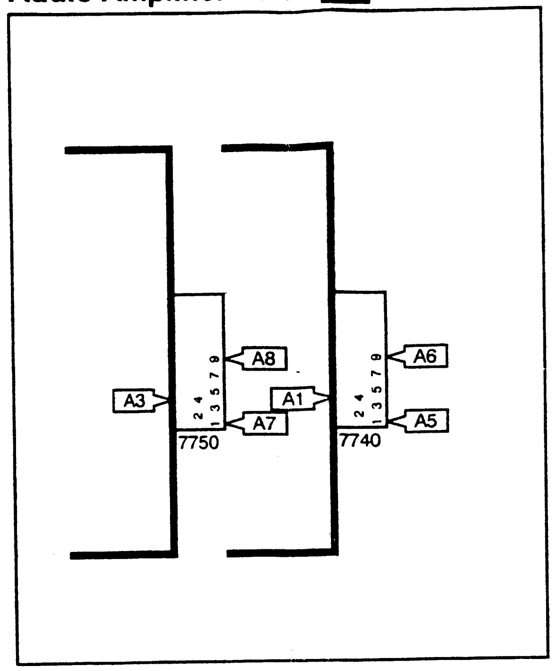
Cordless Dolby Receiver Module AE3


PILOT
3721
FM-DETECTION

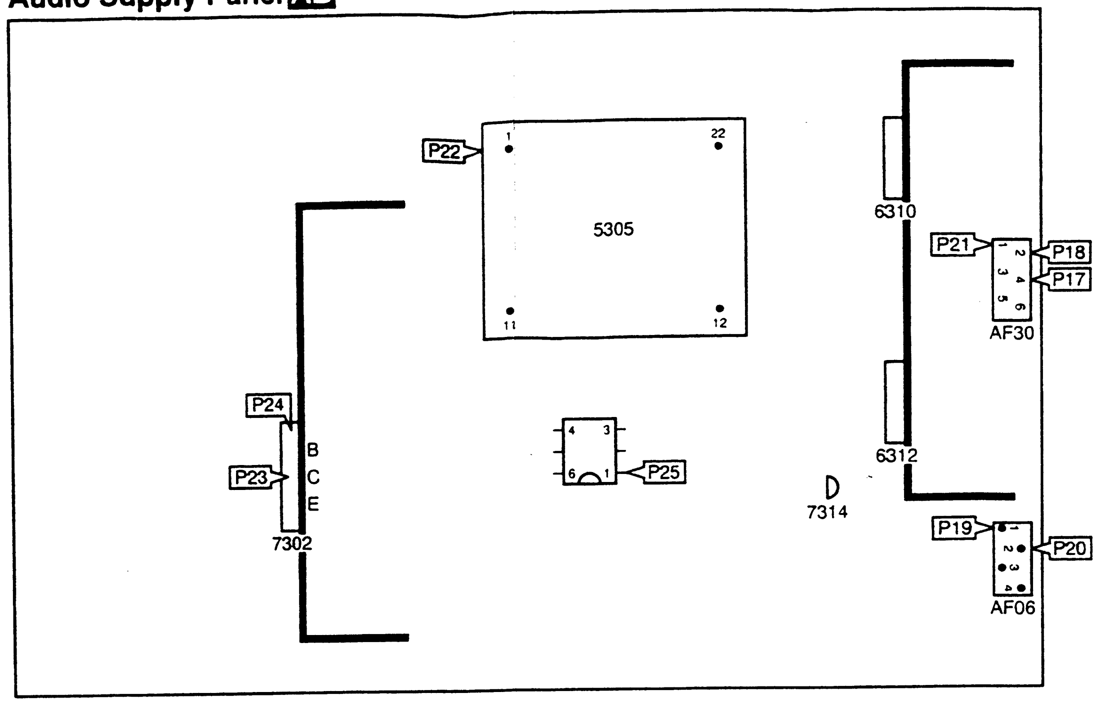
Audio Module O


I44
A4
A3
1
2
3
4
32
29
A7
33 34
A15
A14
S47
1 3 5 7 8 9 11 13 15 17 19

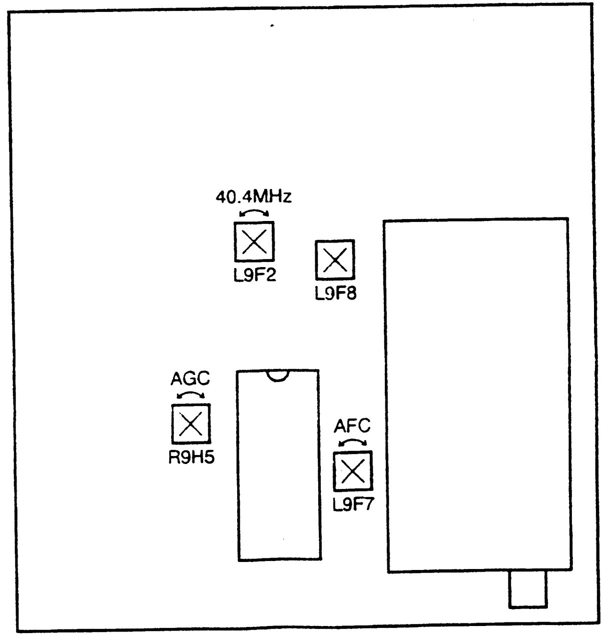
Audio Amplifier Panel AA


A8
A3
A7
7750
A1
A6
A5
7740

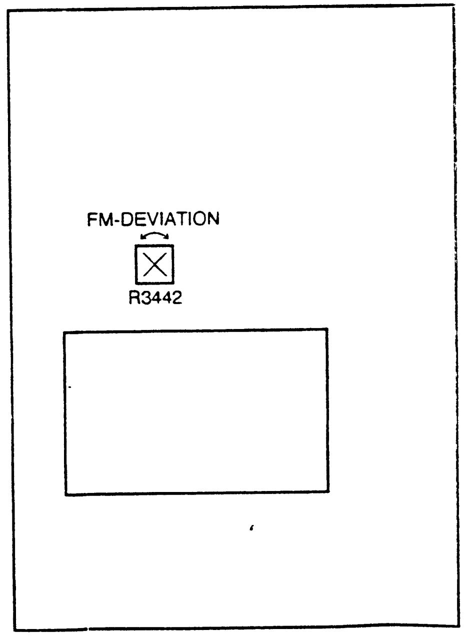
Audio Supply Panel AB


P22
1
22
5305
11
12
6310
P21
P18
P17
AF30
P24
P23
B
C
E
7302
4
3
6
1
P25
7314
6312
P19
P20
AF06

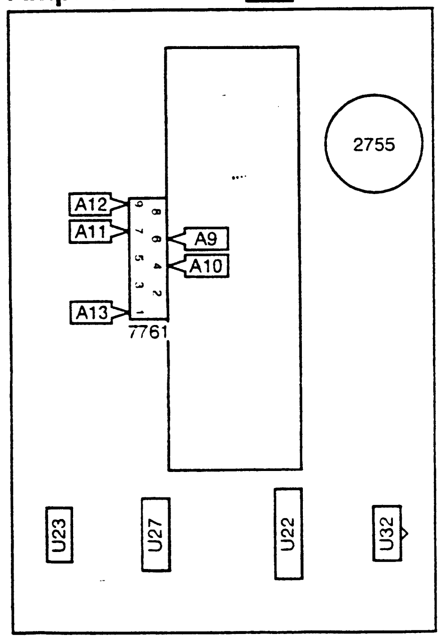
Video Dual Screen Module AC


40.4MHz
L9F2
L9F8
AGC
R9H5
AFC
L9F7

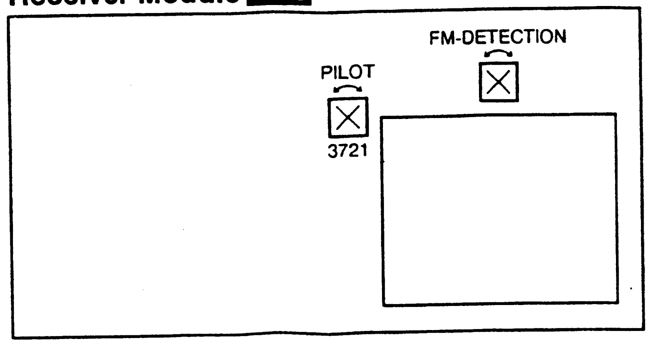
Cordless Dolby Transmitter Module AE1


FM-DEVIATION
R3442

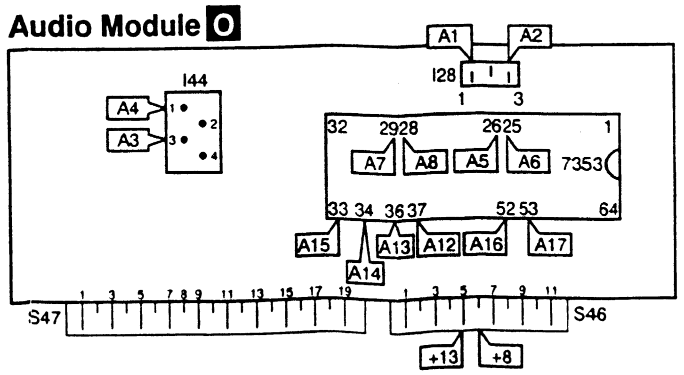
Surround Sound Amplifier Panel H1


2755
A12
A11
A9
A10
A13
7761
U23
U27
U22
U32

Cordless Dolby Receiver Module AE3


FM-DETECTION
PILOT
3721

Audio Module O


A1
A2
I28
1
3
I44
A4
A3
32
2928
2625
1
A7
A8
A5
A6
7353
33 34 3637
5253
64
A15
A13
A12
A16
A17
A14
S47
S46
+13
+8

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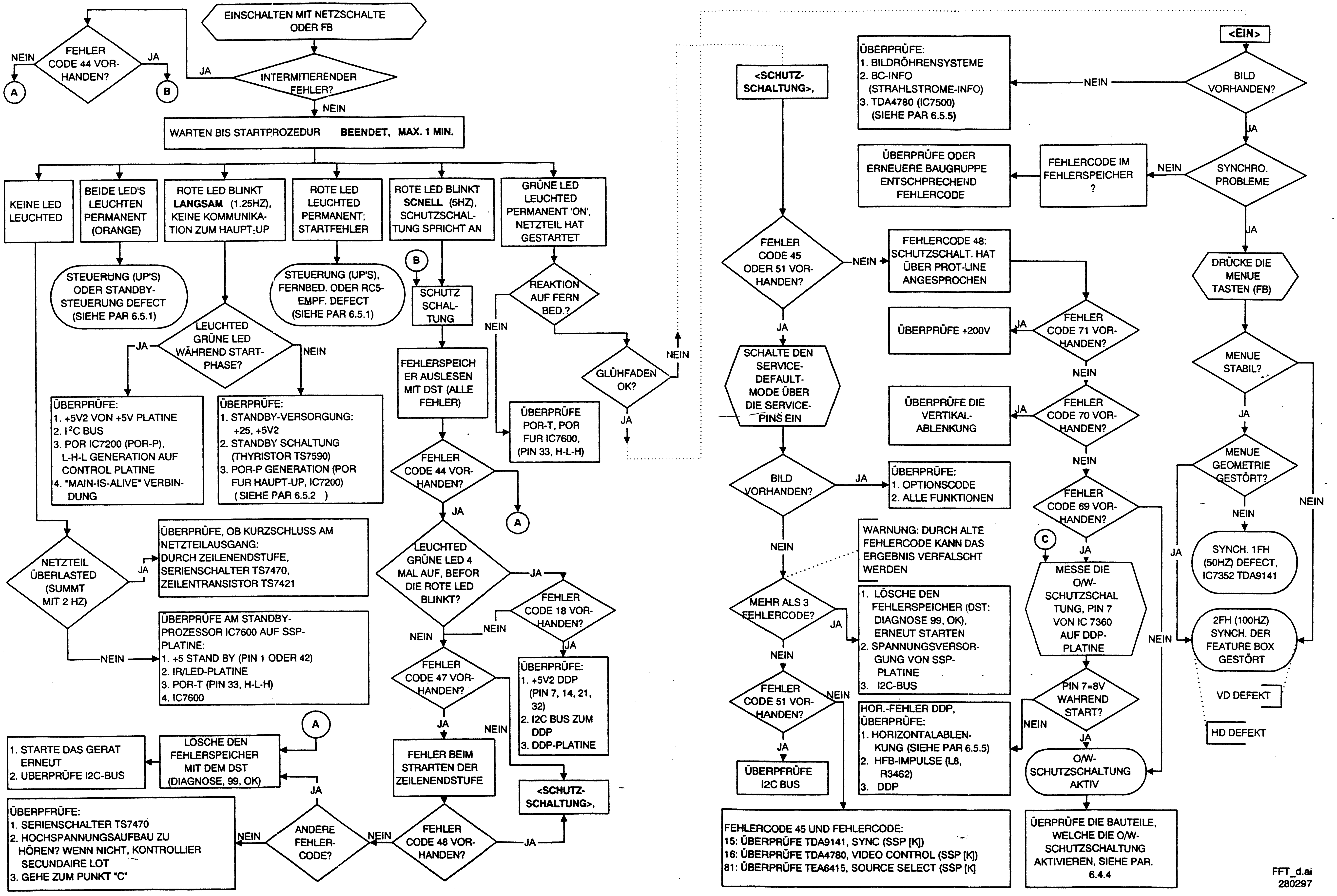
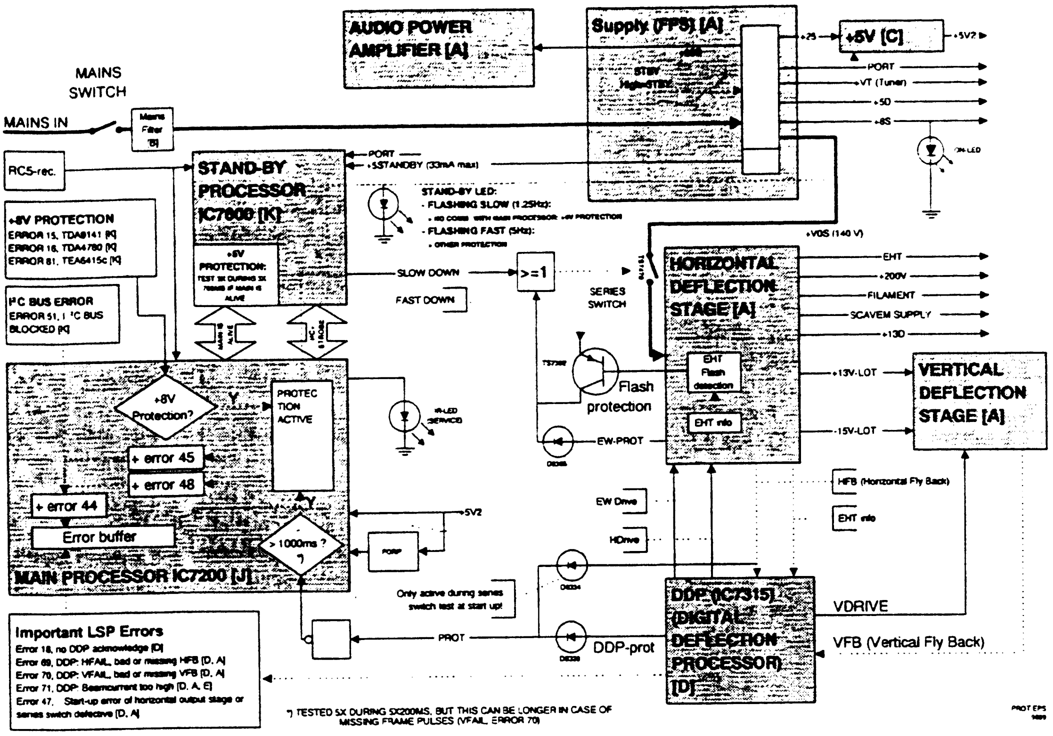
200297


EINSCHALTEN MIT NETZSCHALTE ODER FB
INTERMITIERENDER FEHLER?
JA
NEIN
FEHLER CODE 44 VORHANDEN?
NEIN
JA
A
B
WARTEN BIS STARTPROZEDUR BEENDET, MAX. 1 MIN.
KEINE LED LEUCHTED
BEIDE LED'S LEUCHTEN PERMANENT (ORANGE)
ROTE LED BLINKT LANGSAM (1.25HZ), KEINE KOMMUNIKATION ZUM HAUPT-UP
ROTE LED LEUCHTED PERMANENT; STARTFEHLER
ROTE LED BLINKT SCHNELL (5HZ), SCHUTZSCHALTUNG SPRICHT AN
GRÜNE LED LEUCHTED PERMANENT 'ON', NETZTEIL HAT GESTARTET
STEUERUNG (UP'S) ODER STANDBY-STEUERUNG DEFECT (SIEHE PAR 6.5.1)
STEUERUNG (UP'S), FERNBED. ODER RC5-EMPF. DEFECT (SIEHE PAR 6.5.1)
B
SCHUTZ SCHALTUNG
REAKTION AUF FERN BED.?
NEIN
GLÜHFADEN OK?
NEIN
JA
LEUCHTED GRÜNE LED WÄHREND START-PHASE?
JA
NEIN
ÜBERPRÜFE: 1. +5V2 VON +5V PLATINE 2. I²C BUS 3. POR IC7200 (POR-P), L-H-L GENERATION AUF CONTROL PLATINE 4. "MAIN-IS-ALIVE" VERBINDUNG
ÜBERPRÜFE: 1. STANDBY-VERSORGUNG: +25, +5V2 2. STANDBY SCHALTUNG (THYRISTOR TS7590) 3. POR-P GENERATION (POR FUR HAUPT-UP, IC7200) (SIEHE PAR 6.5.2)
FEHLERSPEICHER AUSLESEN MIT DST (ALLE FEHLER)
ÜBERPRÜFE POR-T, POR FUR IC7600, (PIN 33, H-L-H)
FEHLER CODE 44 VORHANDEN?
JA
A
NETZTEIL ÜBERLASTED (SUMMT MIT 2 HZ)
JA
NEIN
ÜBERPRÜFE, OB KURZSCHLUSS AM NETZTEILAUSGANG: DURCH ZEILENENDSTUFE, SERIENSCHALTER TS7470, ZEILENTRANSISTOR TS7421
ÜBERPRÜFE AM STANDBY-PROZESSOR IC7600 AUF SSP-PLATINE: 1. +5 STAND BY (PIN 1 ODER 42) 2. IR/LED-PLATINE 3. POR-T (PIN 33, H-L-H) 4. IC7600
LEUCHTED GRÜNE LED 4 MAL AUF, BEFOR DIE ROTE LED BLINKT?
JA
NEIN
FEHLER CODE 18 VORHANDEN?
NEIN
JA
ÜBERPRÜFE: 1. +5V2 DDP (PIN 7, 14, 21, 32) 2. I2C BUS ZUM DDP 3. DDP-PLATINE
FEHLER CODE 47 VORHANDEN?
JA
NEIN
FEHLER BEIM STRARTEN DER ZEILENENDSTUFE
<SCHUTZSCHALTUNG>,
A
1. STARTE DAS GERAT ERNEUT 2. UBERPRÜFE I2C-BUS
LÖSCHE DEN FEHLERSPEICHER MIT DEM DST (DIAGNOSE, 99, OK)
JA
ÜBERPFRÜFE: 1. SERIENSCHALTER TS7470 2. HOCHSPANNUNGSAUFBAU ZU HÖREN? WENN NICHT, KONTROLLIER SECUNDAIRE LOT 3. GEHE ZUM PUNKT "C"
NEIN
ANDERE FEHLERCODE?
NEIN
FEHLER CODE 48 VORHANDEN?
JA
<EIN>
BILD VORHANDEN?
NEIN
JA
ÜBERPRÜFE: 1. BILDRÖHRENSYSTEME 2. BC-INFO (STRAHLSTROME-INFO) 3. TDA4780 (IC7500) (SIEHE PAR 6.5.5)
SYNCHRO. PROBLEME
NEIN
JA
FEHLERCODE IM FEHLERSPEICHER ?
ÜBERPRÜFE ODER ERNEUERE BAUGRUPPE ENTSCHPRECHEND FEHLERCODE
DRÜCKE DIE MENUE TASTEN (FB)
MENUE STABIL?
JA
NEIN
MENUE GEOMETRIE GESTÖRT?
JA
NEIN
SYNCH. 1FH (50HZ) DEFECT, IC7352 TDA9141
2FH (100HZ) SYNCH. DER FEATURE BOX GESTÖRT
VD DEFEKT
HD DEFEKT
<SCHUTZSCHALTUNG>,
FEHLER CODE 45 ODER 51 VORHANDEN?
NEIN
JA
FEHLERCODE 48: SCHUTZSCHALT. HAT ÜBER PROT-LINE ANGESPROCHEN
FEHLER CODE 71 VORHANDEN?
JA
NEIN
ÜBERPRÜFE +200V
FEHLER CODE 70 VORHANDEN?
JA
NEIN
ÜBERPRÜFE DIE VERTIKAL-ABLENKUNG
FEHLER CODE 69 VORHANDEN?
JA
NEIN
C
MESSE DIE O/W-SCHUTZSCHALTUNG, PIN 7 VON IC 7360 AUF DDP-PLATINE
PIN 7=8V WAHREND START?
NEIN
JA
O/W-SCHUTZSCHALTUNG AKTIV
ÜERPRÜFE DIE BAUTEILE, WELCHE DIE O/W-SCHUTZSCHALTUNG AKTIVIEREN, SIEHE PAR. 6.4.4
SCHALTE DEN SERVICE-DEFAULT-MODE ÜBER DIE SERVICE-PINS EIN
BILD VORHANDEN?
JA
NEIN
ÜBERPRÜFE: 1. OPTIONSCODE 2. ALLE FUNKTIONEN
WARNUNG: DURCH ALTE FEHLERCODE KANN DAS ERGEBNIS VERFALSCHT WERDEN
MEHR ALS 3 FEHLERCODE?
JA
NEIN
1. LÖSCHE DEN FEHLERSPEICHER (DST: DIAGNOSE 99, OK), ERNEUT STARTEN 2. SPANNUNGSVERSORGUNG VON SSP-PLATINE 3. I2C-BUS
FEHLER CODE 51 VORHANDEN?
NEIN
JA
ÜBERPFRÜFE I2C BUS
HOR.-FEHLER DDP, ÜBERPRÜFE: 1. HORIZONTALABLENKUNG (SIEHE PAR 6.5.5) 2. HFB-IMPULSE (L8, R3462) 3. DDP
FEHLERCODE 45 UND FEHLERCODE: 15: ÜBERPRÜFE TDA9141, SYNC (SSP [K]) 16: ÜBERPRÜFE TDA4780, VIDEO CONTROL (SSP [K]) 81: ÜBERPRÜFE TEA6415, SOURCE SELECT (SSP [K]
FFT_d.ai 280297

Reparaturtips

Schaltbild Schutzvorrichtungen

MD 2.21/2.22/2.23 E protection diagram (2fH versions)


AUDIO POWER AMPLIFIER [A]
Supply (FPS) [A]
STBY
High-STBY
+25
+5V [C]
+5V2
PORT
+VT (Tuner)
+5D
+8S
ON-LED
MAINS SWITCH
MAINS IN
Mains Filter [B]
RC5-rec.
STAND-BY PROCESSOR IC7600 [K]
PORT
+5STANDBY (33mA max)
STAND-BY LED:
- FLASHING SLOW (1.25Hz):
- FLASHING FAST (5Hz):
- OTHER PROTECTION
+8V PROTECTION:
+8V PROTECTION
ERROR 15, TDA9141 [K]
ERROR 16, TDA4780 [K]
ERROR 81, TEA6415c [K]
I²C BUS ERROR
ERROR 51, I ²C BUS BLOCKED [K]
MAIN IS ALIVE
SLOW DOWN
FAST DOWN
>=1
SERIES SWITCH
+V0S (140 V)
HORIZONTAL DEFLECTION STAGE [A]
EHT
+200V
FILAMENT
SCAVEM SUPPLY
+130
EHT Flash detection
EHT info
+13V-LOT
-15V-LOT
VERTICAL DEFLECTION STAGE [A]
Flash protection
EW-PROT
IR-LED (SERVICE)
+8V Protection?
Y
PROTEC TION ACTIVE
+ error 45
+ error 48
+ error 44
Error buffer
> 1000ms ? *)
MAIN PROCESSOR IC7200 [J]
5V2
POR
EW Drive
HDrive
HFB (Horizontal Fly Back)
EHT info
Only active during series switch test at start up!
PROT
DDP-prot
DDP (IC7315) (DIGITAL DEFLECTION PROCESSOR) [D]
VDRIVE
VFB (Vertical Fly Back)
Important LSP Errors
Error 18, no DDP acknowledge [D]
Error 69, DDP: HFAIL, bad or missing HFB [D, A]
Error 70, DDP: VFAIL, bad or missing VFB [D, A]
Error 71, DDP: Beamcurrent too high [D, A, E]
Error 47, Start-up error of horizontal output stage or series switch defective [D, A]
*) TESTED 5X DURING 5X200MS, BUT THIS CAN BE LONGER IN CASE OF MISSING FRAME PULSES (VFAIL, ERROR 70)
PROT EPS

Fehlermeldungen

Fehler	Bauteil	Beschreibung	Nr.	Platine	Anzeige eines defekten Moduls im SAM	MD2.1	MD2.2
0	Kein Fehler		-	-	keine Fehler	x	x
4	ST24C16B1	NVM EAROM 2048 Bytes	7201	SSP	Steuerung	K	K
6	UV916S	Tuner	1100	SSP	Tuner	K	K
15	TDA914X	Video- und Synchronisationsprozessor	7352	SSP	Video-Processing (Kleinsignalplatine)	K	K
16	TDA4780	Video-Steuerung	7500	SSP	Video-Steuerung	K	K
18	TDA9155	DDP-Prozessor	7315	DDP (Geometrie)	Geomtrie-Prozessor	D	D
28	SAA5270	TXT-Prozessor	7400	TXT	Teletext	J	J
29	PCF83CE652_featurebox	FBX-Microprozessor	7505	FBX	Feature-Box	M	M
33	SDA9288_2_pip2	PIP-Prozessor	7788	PIP	PIP	S	S
34	UV12xx	PIP- oder DW-Tuner	1775/E9F1	PIP / DW	PIP / Video-DualScreen	S	S / AC
36	PCF8574_pip	I/O-expander for PIP forced colour	7860	PIP	PIP	S	S
37	SAB9077H_dwi	PIPO (Picture In Picture Out)	IC9A	Video DualScreen	Video Dual-Screen	-	AC
38	PCF8574_dwi	E/A-Erweiterungsschaltung für DW	IC9N	Video DualScreen	Video Dual-Screen	-	AC
39	TDA914x_dwi	Video- und Syncchronisationsprozessor für DW	IC9J	Video DualScreen	Video Dual-Screen	-	AC
44	SW_protection (Mikroprozessor hat Schutz gewählt)	Erzeugt nach Fehlerkode 51, 18, 69, 70 or 71	-	-	SW-Schutz	x	x
45	Supply_8 V	TDA4780 + TDA914x + TEA6415 (+ TDA9860)	-	-	+8V-Speisungsfehler	K	K
47	+140_serie_switch_ protection	Serienschutzschalter (nur geprüft beim Einschalten)	-	LSP	Serienschalter 140 V	A	A
48	Protection (prot-line)	Hardware-Schutz (eingeschaltet von der PROT-line)	-	LSP + DDP	HW-Schutz	A+D	A+D
51	I2c_slow_bus	Blockiert I²C-Slow-Bus (gekürzte SDA, SCL oder SDA zu SCL)	-	-	I²C-Bus blockiert	x	x
58	TDA9860_vds	Ton-Prozessor im Dolby-Ton- Modul für Video DualScreen	7590	Dolby Audio Module	Audio-Modul	-	P
64	TDA9177_LTP	Zeilen-Transient-Prozessor	7580	SSP	Video-Steuerung /Bildsignalverbessg.	-	K
69	Protection_hfail	Horizontalablenkungsfehler (DDP-Protection)	-	DDP + LSP	Horizontalschaltung	D	D
70	Protection_vfail	Vertikalablenkungsfehler (DDP-Protection)	-	DDP + LSP	Vertikalschaltung	D	D
71	Protection_overcurrent	Überstrom-Schutz (DDP-Protection); Strahlstrom zu hoch	-	DDP + LSP	Strahlstrom	D	D
79	TDA9860_DW	Ton-Prozessor für DW	-	-	-	-	AC
80	MSP3400/3410	FM/NICAM-Dekodierer und Tonquellenwahl	7353	Audio module	Audio-Modul	O/P	O/P
81	TEA6415	Quellenwahl-Video-Matrix	7406	SSP	Quellenwahl	K	K
82	TMP47C640/840	Standby(E/A)-Prozessor	7600	SSP	Stand-by-Prozessor	K	K
85	SAA7710T	Dolby-Prozessor	7600	Dolby audio	Audio-Modul	O/P	O/P
86	PCF8574A	E/A-Erweiterungsschaltung für Rasterdrehung	7050	N/S + ROT	Drehungsplatine	F2	F2
88	TSA5520	Drahtlos-Dolby	1403	Drahtlos Dolby-trans	Dolby--Sender	-	AE1

Dieses Kapitel enthält folgende Abschnitte:

6.1 Meßpunkte
6.2 Service-Modi und Händlerfernbedienung
6.3 Fehlerkodes
6.4 Schutzvorrichtungen
6.5 Fehlersuche und Reparaturtips

6.1 Meßpunkte

Das MD2-Chassis verfügt über Meßpunkte auf der Service-Platine. Diese Meßpunkte beziehen sich auf die Funktionsblöcke:

- P1-P2-P3, usw.: Meßpunkte für das Netzteil
- L1-L2-L3, usw.: Meßpunkte für die Zeilenansteuerung und die Zeilenendstufe
- F1-F2-F3, usw.: Meßpunkte für die Vertikalansteuerung und die Vertikalendstufe
- S1-S2-S3, usw.: Meßpunkte für die Synchronisation
- V1-V2-V3, usw.: Meßpunkte für die Bildverarbeitungsstufen
- I1-I2-I3, usw.: Meßpunkte für das ZF-teil
- A1-A2-A3, usw.: Meßpunkte für die Tonverarbeitungsstufen
- C1-C2-C3, usw.: Meßpunkte für Steuerung und μP
- T1-T2-T3, usw.: Meßpunkte für den Videotextdecoder

Die Numerierung entspricht einer logischen Reihenfolge für Diagnosezwecke. Eine Diagnose sollte immer innerhalb eines Funktionsblocks begonnen und in der Reihenfolge der betreffenden Meßpunkte für den jeweiligen Funktionsblock durchgeführt werden.

6.2 Service-Modi und Händlerfernbedienung

Gleichzeitig mit dem GFL-Chassis wurde eine Händlerfernbedienung eingeführt, die RC7150, auch DST oder Dealer Service Tool genannt. Diese RC7150 ist eine Fernbedienung für den Händler und den Techniker, und ist mit dem MD2 voll kompatibel.

6.2.1 Installationsmerkmale für den Händler

Der Händler kann diese Fernbedienung zum Vorprogrammieren des Fernsehgerätes in Bezug auf die Persönlichen Werte, Fernseheinstellungen, Schüsseleinstellungen und Logos verwenden. Wie das GFL können auch das MD2 und viele bestehende Geräte wie MD1, AA5, FL, GR2, G90B, G110 und die neue Serie der Philips-Video-Cassetten-Recorder mit dem sogenannten NORA-Deck programmiert werden.

Eines der innovativen Merkmale der Händlerfernbedienung ist die Art der Programmierung. Eine vollständige Liste mit Voreinstellungen kann einfach vom MD2 (oder GFL) in die Händlerfernbedienung heruntergeladen werden. Für dieses 'Herunterladen' wird eine Zweiwegkommunikationsverbindung, die sogenannte 'Dealer Link', zwischen der RC7150 und dem MD2-Fernsehgerät benutzt. Zu diesem Zweck sind die MD2-Geräte mit einer zusätzlichen Infrarot-Sende-Leuchtdiode ausgestattet, und die RC7150 hat einen eingebauten Infrarotempfänger. Die Händlerverbindung funktioniert jedoch nur über kurze Entfernung, höchstens bis zu 10 cm. Eine Erläuterung der Installationsmerkmale der Händlerfernbedienung ist der Betriebsanleitung der Händlerfernbedienung zu entnehmen (zum richtigen Herunterladen Kode 4 benutzen).

Die untenstehende Abbildung zeigt die Lage der Händlerfernbedienung bei den verschiedenen Ausführungen:

Ausführung mit Bedienung mitte oben:

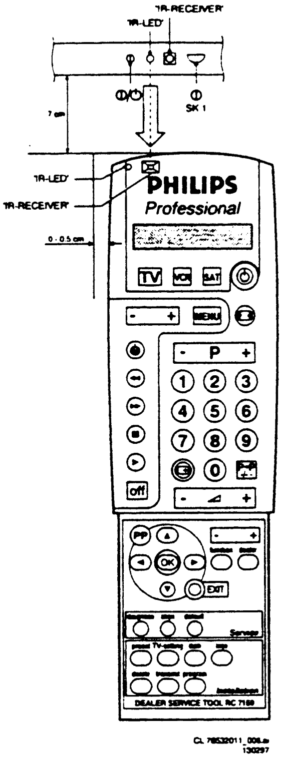

IR-RECEIVER
IR-LED
SK 1
7 cm
IR-LED
IR-RECEIVER
0-0.5 cm
PHILIPS
Professional
TV
VCR
SAT
MENU
P
1 2 3
4 5 6
7 8 9
0
off
OK
EXIT
DEALER SERVICE TOOL RC 7150
CL 76532011_008.ai
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Abb. 6.1

Ausführung mit Bedienung rechts:

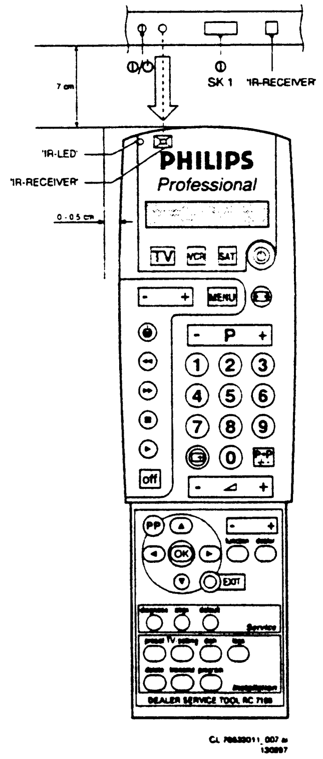
SK 1
IR-RECEIVER
7 cm
IR-LED
IR-RECEIVER
0-0.5 cm
PHILIPS
Professional
TV
VCR
SAT
MENU
P
1 2 3
4 5 6
7 8 9
0
off
OK
EXIT
DEALER SERVICE TOOL RC 7150
CL 76532011_007.ai
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Abb. 6.2

Fehlerkodes, Schutzvorrichtungen, Fehlersuche und

Ausführung mit Frontbedienung:

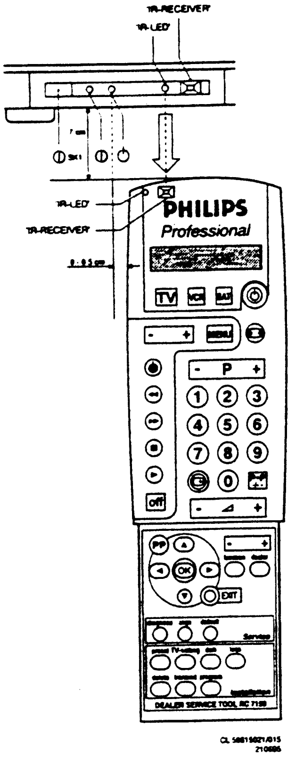


Fig. 6.3

Händler-Modus
Die Taste 'DEALER' auf der Händlerfernbedienung drücken, um den Händler-Modus zu aktivieren. Im Händler-Modus können einige Einstellungen geändert werden, so daß das Gerät auf die Wünsche des Benutzers abgestimmt werden kann.

6.2.2 *Diagnosemerkmale für den Techniker*

Die MD2-Geräte können über die Händlerfernbedienung RC7150 in die verschiedenen Service-Modi geschaltet werden. Der Service-Alignment-Modus und der Service-Default-Modus können auch durch Verbinden der Pins auf der Kleinsignalplatine aktiviert werden.

Service-Default-Modus (SDM)
Daten des SDM:
- Abstimmfrequenz 475,25 MHz.
- Fernsehsystem für BGLM-Gerät auf BG, für BGLL'I-Geräte auf LL'.
- Alle Bildeinstellungen auf 50% (Helligkeit, Farbe, Kontrast, Farbton).
- Alle Toneinstellungen auf 50%, jedoch Lautstärke auf 25% (also Bässe, Höhen, Balance auf 50%, Lautstärke auf 25%).
- Alle den Service erschwerenden Modi sind unwirksam (wie Sleeptimer, Kindersicherung, automatisches Ausschalten, usw.).

Der SDM kann auf zwei verschiedene Arten aktiviert werden:
- Über die Taste 'DEFAULT' auf der Händlerfernbedienung, während sich das Gerät im normalen Betriebsmodus befindet.
- Durch Kurzschließen der beiden Pins auf der Bestückungsseite der Kleinsignalplatine mit der Bezeichnung 'Service-Default-Modus' (die Aktivierung kann in allen Betriebszuständen erfolgen, jedoch nicht bei einem Problem des Gerätes mit dem Haupt-prozessor (dies wird durch eine langsam (1,25Hz) blinkende Leuchtdiode angezeigt)).

Hinweis: Wenn der SDM über die Pins aktiviert wird, sind die Schutzschaltung für den Serienschalter (Fehler 47) und die +8V-Schutzschaltung (Fehler 45) unwirksam.

Der SDM kann über den STANDBY-Befehl wieder verlassen werden. Beim Aus- und Wiedereinschalten des Gerätes mit dem Netzschalter bleibt das Gerät im SDM.

Service-Alignment-Modus (SAM)
Daten des SAM:
- Software-Einstellungen (siehe Kapitel 8).
- Options-Einstellungen (siehe Kapitel 8).
- Fehlerspeicher-Lesen und -Löschen.
  Der jüngste Fehlerkode wird links angezeigt.
- Betriebsstundenzähler.
- Softwareversion.

Der SAM kann auf zwei Weisen aktiviert werden:
- Über die Taste 'ALIGN' auf der Händlerfernbedienung, während sich das Gerät im normalen Betriebsmodus (oder im SDM) befindet. Als Paßwort '3-1-4-0' eingeben und auf OK drücken.
- Durch Kurzschließen der beiden Pins auf der Bestückungsseite der Kleinsignalplatine mit der Bezeichnung 'Service-Alignment-Modus'
  (die Aktivierung kann in allen Betriebszuständen erfolgen, jedoch nicht bei einem Problem des Gerätes mit dem Hauptprozessor (dies wird durch eine langsam (1,25Hz) blinkende Leuchtdiode angezeigt)).
  Hinweis: Wenn der SAM über die Pins aktiviert wird, sind die Schutzschaltung für den Serienschalter (Fehler 47) und der +8V-Schutz (Fehler 45) unwirksam.

Der SAM kann über den MENU-Befehl wieder verlassen werden. Durch Aus- und Wiedereinschalten des Gerätes mit dem Netzschalter gelangt das MD2 wieder in den SDM.

Kundendienst-Modus (CSM)
Um die 'Selbsthilfe-Reparatur' und die 'lästigen Anrufe' besser in den Griff zu bekommen, wird in alle hierfür in Frage kommenden Geräte der sogenannte 'Kundendienst-Modus' eingebracht. Dieser 'Customer Service Mode' (CSM) ist ein spezieller Kundendienst-Modus, der vom Kunden selbst ein- und ausgeschaltet werden kann. Es handelt sich um einen Nur-Lese-Modus, der Kunde kann also nichts darin abspeichern.

Der Kunde schaltet den CSM auf der Fernbedienung ein, indem er die 'MUTE'-Taste und gleichzeitig die MENU-Taste am Gerät mindestens 4 Sekunden gedrückt hält. Dieses Einschalten ist nur möglich, wenn auf dem Bildschirm kein Menü steht.

Der Kunde kann den CSM ausschalten durch:
- Drücken irgendeiner Taste auf der Fernbedienung;
- Gerät mit dem Netzschalter aus- und danach wieder einschalten.

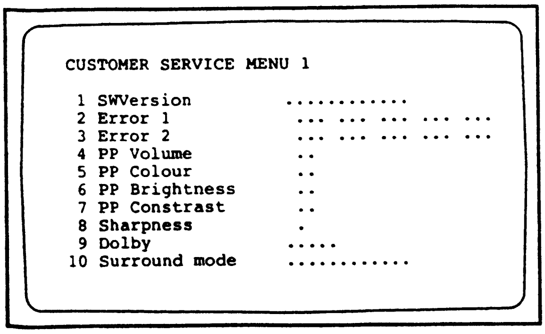
Im 'Kundendienst-Modus' werden die folgenden Einstellungen wiedergegeben:
- Software-Version.
- Fehlerkodepuffer.
- Allgemeine Einstellung der PP-Werte (persönlich bevorzugte Einstellungen) der Lautstärke, des Farbtons, der helligkeit, des Kontrastes (jeder von 0-63) und der Schärfe (von 0-4).
- Dolby-Anzeige (Rauschunterdrückung) 'Eingeschaltet' ('Present') oder 'Nicht eingeschaltet' ('Not present').
  Achtung: Die Anwesenheit der Rauschunterdrückung

(Dolby) kann software-mäßig nur auf dem Dolby Signalling Bit getestet werden. Wenn also eine Dolby-Sendung ohne Dolby Signalling Bit empfangen wird, gibt diese Anzeige 'Not present' an, obwohl doch eine Dolby-Sendung empfangen wird.

- Allgemeine Einstellung des Surround-Modus 'Pro Logic' oder 'Dolby 3 Stereo' oder 'Hall' oder 'Uit'.
- Allgemeine Einstellung der Lautstärke hinten (0-63); der Lautstärke der Surround-Lautsprecher im 'Pro Logic'- oder 'Dolby 3 Stereo'- oder 'Hall'-Modus.
- Allgemeine Einstellung der Lautstärke mitte (0-63); der Lautstärke der Mittel-Lautsprecher im 'Pro Logic'- oder 'Dolby 3 Stereo'-Modus.
- Lokale Einstellung der DNR und eines Wertes für die Rauschziffer (gutes Signal 0-2, mittelmäßiges Signal 4-5, schlechtes Signal 7 oder höher).
- Allgemeine Einstellung der Digital-Möglichkeit ('100 Hz', 'Digital Scan' oder 'Natural Motion').
- Einzeleinstellung / Erkennung der Fernseh- und Ton-System-Information: 'NICAM' / 'MONO' / 'A2' (analoger Stereo-Ton) / 'DUAL' und 'PAL' / 'SECAM' / 'NTSC'.
- Verstimmter Bit (*Detuned Bit*) ist 'Yes' oder 'No';
  Dieser Bit gibt an, ob das gewählte Programm nach einer *Microsearch* gespeichert worden ist oder nicht; bei 'Yes' ist das Programm gespeichert durch Eingeben von Hand der Frequenz, ohne daß auf dieser Frequenz ein Sender anwesend war. In diesem Fall versucht das Fernsehgerät jedesmal, wenn diese Programmnummer gewählt wird, eine *Microsearch* auszuführen. Wenn diese *Microsearch* ein einziges Mal gelungen ist, wird der *Detuned Bit* auf 'No' geschaltet.
- Die allgemeine Einstellung im Konfigurationsmenü bei 'VCR-type' ist 'PALplus' of 'Non PALplus';
  Wenn PALplus VCR-type gewählt worden ist, wird die Leuchtdichte und die Farbart für das VCR-Signal auf der PALplus-Platine dekodiert. Wenn diese Konfiguration falsch eingestellt worden ist, erscheinen Streifen auf dem Bildschirm.
- Die allgemeine Einstellung im Konfigurationsmenü bei 'CD-i / Photo-CD' ist 'Present' oder 'Not Present';
  Ist 'Present' gewählt worden, wird von einem erstklassigen Signal ausgegangen, so daß einige Einstellungen automatisch geändert werden. Ist diese Konfiguration falsch eingestellt worden, ist die Bildqualität schlechter.

Alle Einstellungen werden sofort 'real time' wiedergegeben. Die gezeigten Einstellungen sind also diejenigen, die im Augenblick des Einschaltens des CSMs eingestellt waren. Die 'allgemeinen' Einstellungen gelten für alle Programme, die Einzeleinstellungen werden nur für das jeweilige Programm betrachtet, das im Augenblick des Einschaltens des CSMs gewählt worden war.

Der Bildschirm sieht folgendermaßen aus:



```
CUSTOMER SERVICE MENU 1

 1 SWVersion          ............
 2 Error 1             ... ... ... ... ...
 3 Error 2             ... ... ... ... ...
 4 PP Volume          ..
 5 PP Colour          ..
 6 PP Brightness      ..
 7 PP Constrast       ..
 8 Sharpness          .
 9 Dolby              .....
10 Surround mode      ............
```

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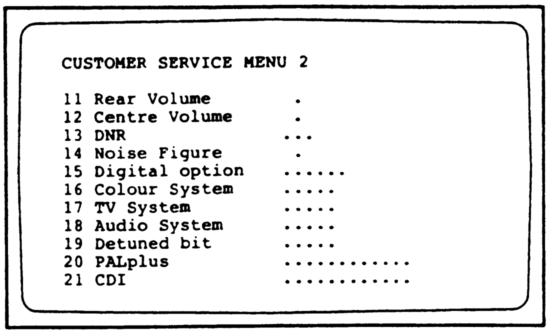
Fig. 6.4a



```
CUSTOMER SERVICE MENU 2

11 Rear Volume        .
12 Centre Volume      .
13 DNR                ...
14 Noise Figure       .
15 Digital option     ......
16 Colour System      .....
17 TV System          .....
18 Audio System       .....
19 Detuned bit        .....
20 PALplus            ............
21 CDI                ............
```

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Fig. 6.4b

Diagnose-Modus (nur während des Sendens von Fehlerkodes und Diagnose 99 aktiv)
Dieser Modus wird über den DIAGNOSE-Befehl auf der Händlerfernbedienung aktiviert, und dient zum Lesen der Fehlerkodes und zum Löschen des Fehlerspeichers mit der Händlerfernbedienung, selbst wenn eine Schutzschaltung des Gerätes wirksam ist, und daher kein Bild vorhanden ist (vorausgesetzt, das Netzteil und das Steuerteil funktionieren). Zur Aktivierung siehe Abschnitt 6.3.
Der Diagnose-Modus ist lediglich ein vorübergehender Modus (das Gerät kehrt in den vorhergehenden Modus zurück), und kann damit nicht permanent eingeschaltet werden.

Hinweis: Bei aktiviertem SAM kann der Diagnose-Modus nicht eingeschaltet werden.

6.3 Fehlerkodes

6.3.1 Fehlerkodes im Fehlerspeicher lesen

Der Fehlerspeicher kann auf zwei Weisen gelesen werden:

1. Auf dem Bildschirm über den Service-Alignment-Modus (SAM):
   Wenn das Bild in Ordnung ist, kann der Fehlerspeicher am einfachsten über den SAM gelesen werden. Im Hauptmenü des SAM werden die 10 zuletzt aufgetretenen, unterschiedlichen Fehlerkodes angezeigt. Der jüngste, erfaßte Fehlerkode wird ganz links angezeigt, also bedeutet z.B.:

0 0 0 0 0	Der Speicher enthält keinen Fehlerkode.
3 0 0 0 0	Der Speicher enthält einen Fehlerkode: Fehlerkode 3.
2 3 0 0 0	Der Speicher enthält zwei Fehlerkodes: Fehlerkode 2 wurde zuletzt erfaßt, davor wurde Fehlerkode 3 erfaßt.

2. Auf der Anzeige der Händlerfernbedienung:
   Wenn das MD2-Chassis einen Fehler hat, wird möglicherweise ein Fehlerkode in den Speicher geschrieben und die Schutzschaltung für das Gerät wirksam. Auch ohne Bild können die Fehler über die Händlerfernbedienung gelesen werden, vorausgesetzt, der Hauptprozessor funktioniert noch (grüne Leuchtdiode leuchtet ununterbrochen und rote Leuchtdiode blinkt schnell (5Hz); bei einer langsam blinkenden roten Leuchtdiode (1,25Hz) liegt eine Störung des Hauptprozessors vor).

Zum Senden der Fehler vom Fernsehgerät zur Händlerfernbedienung folgendermaßen vorgehen:

1. Die Taste 'DIAGNOSE' drücken (in allen Modi außer dem SAM);
2. '1' drücken, um den zuletzt erfaßten Fehler anzeigen zu lassen;
3. Die Händlerfernbedienung 5 bis 10 cm vor die Stand-by-Leuchtdiode des Gerätes halten (die Infrarot-Sende-Leuchtdiode des MD2 befindet sich neben der Stand-by-Leuchtdiode);
4. Die Taste 'OK' drücken.

Der Fehler wird durch eine zweistellige Ziffer dargestellt. Die beiden Ziffern auf der Händlerfernbedienung werden nacheinander angezeigt und wiederholt, wobei vor jeder Wiederholung eine Pause auftritt. Die Ziffer nach der Pause ist die erste Ziffer. Wenn 4 - 7 angezeigt wird, ist der Fehlerkode 47. Sollen andere Fehlerkodes gelesen werden, drücken Sie die Taste 'DIAGNOSE' und die entspechende Zifferntaste.

Hinweis:

- Wenn keine einwandfreie Kommunikation zwischen der Händlerfernbedienung und dem MD2 möglich ist, wird auf der Anzeige der Händlerfernbedienung Fehler 2 (ERROR 2) angezeigt. Häufig hilft es bereits, wenn man die Position der Händlerfernbedienung leicht ändert.
- Wenn der Fehlerspeicher des MD2 leer ist, zeigt die Händlerfernbedienung keine Fehler an, und die Anzeige bleibt leer.

6.3.2 *Löschen des Fehlerspeichers*

Der Fehlerspeicher kann auf zwei Weisen gelöscht werden:

1. Im SAM wird die Option RESET ERROR BUFFER (Fehlerspeicher zurücksetzen) im Hauptmenü gewählt.
2. Über den Befehl 'DIAGNOSE 99' der Händlerfernbedienung (in allen Modi außer dem SAM). Die Taste DIAGNOSE auf der Händlerfernbedienung drücken, dann 9 und 9 und dann <OK>.

6.3.3 *Fehlerkodetabelle*

Siehe Seite 8.

Hinweis: Wenn auf der Händlerfernbedienung der Text 'Error 2' angezeigt wird, bedeutet das, daß die Kommunikation vom Fernsehgerät zur Händlerfernbedienung nicht funktioniert hat.

6.4 Schutzvorrichtungen

6.4.1 *Struktur der Schutzschaltungen*

Die MD2-'Schutzschaltungsübersicht' veranschaulicht die Struktur des Schutzsystems (Siehe des schutzschaltungsübersicht auf Seite 8).

Zwei Mikroprozessoren

Das MD2-Chassis hat zwei Mikroprozessoren. Der Mikroprozessor auf der Kleinsignalplatine ist der sogenannte I/O- oder Stand-by-Prozessor, der auch im Stand-by-Betrieb aktiv bleibt. Der Stand-by(-I/O)-Prozessor wird sowohl bei normalem Betrieb als auch bei Stand-by-Betrieb vom Netzteil aus versorgt. Der Stand-by(-I/O)-Prozessor steuert die Stand-by-Leuchtdiode, die STANDBY-Verbindung zum Ein- und Ausschalten des Netzteils und die SLOW-DOWN-Verbindung zum Ausschalten der Zeilenendstufenversorgung. Im Diagnose-Modus leitet der Stand-by(-I/O)-Prozessor die RC5-Kommunikation an den Hauptprozessor weiter. Die Kommunikation zwischen den beiden Prozessoren erfolgt über den I^2C-Bus. Eine zusätzliche STROBE-Verbindung sorgt für die Adressierung des Stand-by(-I/O)-Prozessors, da der Stand-by(-I/O)-Prozessor nicht über eine definierte I^2C-Bus-Adresse verfügt. Der einwandfreie Zustand des Hauptprozessors wird durch die MAIN-IS-ALIVE-Verbindung überprüft. Durch diese Verbindung wird auch angezeigt, ob die +5V2-Spannung vorhanden ist. Über diese Verbindung erfolgt auch die Übernahme von Fehlerkodes beim Auslesen mit DST, damit diese nicht durch einen gesperrten I^2C-Bus verhindert wird.

Die Kommunikation für die Diagnose-Informationen der Händlerfernbedienung (Diagnose-Modus) erfolgt über eine an den Hauptprozessor angeschlossene Service-Infrarot Leuchtdiode. Dies bedeutet, daß bei einer aktivierten Schutzschaltung das Netzteil und der Hauptprozessor aus dem Stand-by-Modus geschaltet werden müssen, damit die Übernahme von Diagnose-Informationen möglich ist.
Nach dem Aufrufen der Fehlerkodes aus dem Fehlerspeicher (mit der Händlerfernbedienung) schaltet der Stand-by(-I/O) Prozessor das Netzteil und den Hauptprozessor kurz ein, und daraufhin sendet der Hauptprozessor die Kodes zur Service-Infrarot Leuchtdiode. Nach der Übernahme kehren Hauptprozessor und Netzteil wieder in ihren vorigen Modus zurück (bei einer Schutzschaltung kehrt das Netzteil in den Stand-by-Modus zurück, und der Hauptprozessor wird wieder ausgeschaltet).

Verschiedene Schutzstufen

Über den Reihenschalter TS7470 kann die Versorgung der Zeilenablenkstufe ein- und ausgeschaltet werden. Normalerweise wird der Reihenschalter TS7470 (beim Ein- und Ausschalten) durch das SLOW-DOWN-Signal vom Stand-by (-I/O)-Prozessor kontrolliert, bei einem dringenden Schutzschaltungsvorgang schaltet jedoch das FAST-DOWN-Signal welches auf der DDP-Platine erzeugt wird, die Zeilenablenkstufe direkt aus. Ein dringender Schutzschaltungsvorgang gelangt über die 'PROT-Line' und einen Gleichrichter auch zum Hauptprozessor. Wenn die 'PROT-Line' aktiv ist, ist sie 'High' ('Low' am Eingangspin 62 des Hauptprozessors).

Das Schutzschaltungssystem des Chassis hat drei verschiedene Stufen:

- Falscher Alarm
  Während kurzer Zeit ist etwas nicht in Ordnung, es braucht jedoch nichts unternommen zu werden. Ein Beispiel hierfür: kurze Abwesenheit von Vertikalrücklaufimpulsen, z.B. nach dem Umschalten auf ein anders Programm.
- Echter Alarm
  Es ist etwas nicht in Ordnung, es braucht jedoch nicht sofort etwas unternommen zu werden. Die Verarbeitung erfolgt durch die beiden Mikroprozessoren und kann einige Sekunden dauern. Der Stand-by(-I/O)-Prozessor schaltet die Zeilenablenkstufe aus, indem über die SLOW-DOWN-Verbindung der Reihenschalter TS7470 geöffnet wird. Anschließend wird über die STANDBY-Verbindung das Netzteil ausgeschaltet.
- Dringender Alarm
  Es wird ein Problem festgestellt, aufgrund dessen die Zeilenendstufe unverzüglich ausgeschaltet werden muß. Der Reihenschalter TS7470 wird über die FAST-DOWN-Verbindung geöffnet. Wenn die Fehlersituation auch nach fünfmaligem Testen (nach 200ms, 400ms, 600ms, 800ms und 1000ms) noch immer vorliegt, übernimmt der Hauptprozessor die Verarbeitung als 'echten Alarm'; der Hauptprozessor gibt die entsprechenden Informationen an den

Reparaturtips

6.4.4 Ost/West-Schutzschaltung (EW_PROT)

Die Ost/West-Schutzschaltung schaltet den Reihenschalter TS7470 direkt über das FAST-DOWN-Signal und Diode D6365 auf der Digitalablenkprozessor-Platine aus. Durch das FAST-DOWN-Signal wird der Reihenschalter TS7470 geöffnet, es ist kein HFB-Signal mehr vorhanden, und folglich wird auch die 'PROT-Line' über den Digitalablenkprozessor DDP und IC7360 aktiv, und dadurch kann der Hauptprozessor die Schutzschaltungsverarbeitung übernehmen. Die Ost/West-Schutzschaltung erfaßt einen zu hohen Strom durch die Horizontal-Ablenkendstufe um TS7480 herum.

Hinweis: **Ein zu hoher Strom durch die Horizontalstufe kann durch ein defektes Teil im Zeilenablenkkreis verursacht werden!!!**

Der Strom durch die O/W-Endstufe wird auf der Großsignalplatine über 2 Präzisionswiderstände (R3483 und R3484) gemessen. Bei einem Fehler in der Zeilen-endstufe steigt die Spannung über diesen Widerstände. Diese Spannung wird an den positiven Eingangspin 5 des Op-Amp IC7360 auf der Digitalablenkprozessor-Platine gelegt. Der negative Eingang ist an einen festen Gleichspannungspegel von etwa 1V1 angeschlossen. Wenn die Spannung am positiven Eingang von IC7360 (EW_PROT-Line) größer als 1V1 wird, dann wird der Ausgang (Pin 7) von IC7360 'high'. Die FAST-DOWN-Verbindung wird über D6365 auch 'high' und schaltet die Versorgung der Zeilenendstufe sofort über den Reihenschalter aus. Die FAST-DOWN-Verbindung bleibt 'high' (über D6362), bis das Netzteil folgendermaßen auf Stand-by (Schutz) geschaltet wird: Da der Reihenschalter geöffnet ist, sind keine HFB-Impulse mehr vorhanden, und folglich wird die 'PROT-Line' durch den Digitalablenkprozessor 'high' (Fehlerkode 47 oder 48 und 69); nach ≥1000ms 'PROT-Line'=' high' wird das Netzteil in Stand by geschaltet.

Die Ost/West-Schutzschaltung hat keinen eigenen Fehlerkode. Die Aktivierung der Schutzschaltung durch die 'EW_PROT-Line' kann an Pin 7 IC7360 auf der DDP-Platine gemessen werden. Wenn dieser Pin einige Sekunden lang etwa 8V wird, wurde die Schutzschaltung durch eine aktivierte 'EW_PROT-Line' ausgelöst.

Die Ost/West-Schutzschaltung wird in folgenden Fällen aktiv:

1. Schlechte Kontakte im Horizontalablenkkreis:
   - Horizontalablenkspule
   - Linearitätskorrektorspule L5421
   - S-Korrektur-Kondensator C2432
2. Schlechte Kontakte im Rücklaufkondensator C2425 oder C2428.
3. Kurzgeschlossene Rücklaufdiode D6421.
4. Kurzschluß im O/W-Transformator (Sekundärseite von T5424 oder T5422 (einer der beiden Transformatoren ist jeweils eingebaut)).
5. Kurzschluß in Sekundärwicklungen des Zeilentransformators.
6. Kurzgeschlossener S-Korrektur-Kondensator C2432..
7. Schlechte Lötkontakte in der Zeilenendstufe.
   Wenn die Ost/West-Schutzschaltung ausgelöst wurde, kann auch der Zeilentransistor 7421 defekt sein.

6.4.5 Softwareschutz

Der gesamte Softwareschutz wird von den beiden Mikroprozessoren verwaltet und besteht aus einer ständigen Überprüfung hinsichtlich des Vorhandenseins der +5V2-und der +8V-Versorgungsspannung und der ständigen Überprüfung hinsichtlich der Aktivität des I^{2}C-Busses. Diese Überprüfungen erfolgen durch Testen der Kommunikation zwischen den beiden Mikroprozessoren und einer Reihe der an die Versorgungsspannung angeschlossenen ICs. Wenn einer dieser ICs nicht reagiert, wird die (Software-) Schutzschaltung aktiv, und das Netzteil wird auf Stand-by geschaltet.

+5V2-Schutzschaltung des Stand-by(-I/O)-Prozessors
Über die 'MAIN-IS-ALIVE'-Verbindung überprüft der Stand-by(-I/O)-Prozessor alle 700 ms die Funktion des Hauptprozessors, und anschließend auch das Vorhandensein der +5V2-Versorgungsspannung. Wenn die Kommunikation mit dem Hauptprozessor dreimal hintereinander mißlingt, schaltet der Stand-by(-I/O)-Prozessor das Netzteil auf Stand-by, die Stand-by-Leuchtdiode blinkt dann langsam (1,25 Hz).
In diesem Fall kann kein Fehlerkode in den Fehlerspeicher eingetragen werden, da dies die Aufgabe des Hauptprozessors ist, der jedoch nicht reagiert.

+8V-Schutz über den Hauptprozessor
Über eine Reihe von ICs prüft der Hauptprozessor das Vorhandensein der +8V-Versorgungsspannung auf der Kleinsignalplatine. Diese Prüfung erfolgt über den I^{2}C-Bus. Für die Überprüfung der +8V-Versorgungsspannung werden folgende ICs verwendet:

- RGB-Prozessor, TDA4780, (Fehler 16)
- Bilddecoder, Synchronisierung ;TDA9141, (Fehler 15)
- Quellenwahl, TEA6415C, (Fehler 81)

Wenn eines dieser ICs nicht reagiert, wird der Fehlerkode des entsprechenden IC's im Fehlerspeicher zusammen mit Fehler 45 (+8V-Fehler) gespeichert, und der Hauptprozessor gibt dem Stand-by(-I/O)-Prozessor den Befehl, das Netzteil auf Stand-by-Betrieb zu schalten.

I^{2}C-Bus-Schutzschaltung (Fehler 51)
Der (langsame) I^{2}C-Bus wird bei jedem I^{2}C-Bus-Befehl kontrolliert. Damit dies garantiert bei jedem I^{2}C-Bus-Befehl erfolgt, wird eine definierte Start/Stopp-Bedingung erzeugt. Wenn diese definierte Start/Stopp-Bedingung einige Male hintereinander ausfällt, wird Fehler 51 (I^{2}C-Bus-Fehler) in den Fehlerspeicher eingetragen und das Netzteil wird auf Stand-by-Betrieb geschaltet. Bei einem I2C-Bus-Fehler kann der Stand-by(-I/O)-Prozessor noch mit dem Hauptprozessor für den Diagnose-Modus kommunizieren (Fehlerkodes im Speicher lesen und über die Service-Leuchtdiode anzeigen), und zwar durch Kommunikation über die STROBE-Verbindung. Die I^{2}C-Bus-Schutzschaltung wird bei einem Kurzschluß von SDA, SCL oder beiden aktiv.

Hinweis: Der (schnelle) I^{2}C-Bus für Videotext und der I^{2}C-Bus zum EAROM werden nicht zu Schutzzwecken überprüft. Im übrigen sind beide Busse nur auf der TXT+Steuerplatine vorhanden (Platine mit dem Hauptprozessor).

Fehlerkodespeicher ab, und der Stand-by(-I/O)-Prozessor schaltet das Netzteil aus. Ein 'dringender Alarm' kann durch die Ost-West-Schutzschaltung oder durch eine kurze Spitze im Strahlstrom ausgelöst werden (z.B. nach einem Entladen der Bildröhre (Stoßspannung)).

6.4.2 *Schutz über den Digitalablenkprozessor (IC7315 auf der Digitalablenkprozessor-Platine)*

Der Schutzschaltungsausgang des Digitalablenkprozessors ist über D6320 an die 'PROT-Line' angeschlossen. Nur wenn der Fehler auch nach fünfmaligem Testen (alle 200 ms) noch immer vorhanden ist, gibt der Hauptprozessor dem Stand-by(-I/O)-Prozessor den Befehl zum Ausschalten der Zeilenendstufe über SLOW-DOWN und des Netzteils über den STAND-BY-Befehl.

Kurz vor dem Ausschalten wird das Statusregister des Digitalablenkprozessors gelesen, und der betreffende Fehler wird zusammen mit Fehler 48 (Hardware-Schutz, Prot-Line) in den Fehlerkodespeicher eingetragen. Als Hinweis auf diese Schutzsituation blinkt die Stand-by-Leuchtdiode schnell. Der Fehlerspeicher kann über die Händlerfernbedienung gelesen werden.

Wenn der Digitalablenkprozessor die 'PROT-Line' 'high' werden läßt, enthält das Statusregister des Digitalablenkprozessors Informationen über den Grund des Schutzschaltungsvorganges. Wenn der Hauptprozessor das Statusregister über I²C-Bus gelesen hat, wird die 'PROT-Line' 'low', und das Statusregister wird gelöscht. Wenn sich der Fehler wiederholt, wird die 'PROT-Line' erneut 'high', und das Statusregister wird wieder beschrieben.

Der Digitalablenkprozessor kann 3 Fehler erfassen:

- Horizontalstörung: HFB-Impulse haben nicht die richtige Form oder sind nicht vorhanden (Fehler 69).
- Vertikalstörung: VFB-Impulse haben nicht die richtige Form oder sind nicht vorhanden (Fehler 70).
- Hochspannung: Zu hoher Strahlstrom (Hochspannungs-Info) (Fehler 71).

Wenn der Digitalablenkprozessor nicht mehr mit dem Hauptprozessor kommuniziert, trägt der Hauptprozessor Fehler 18 in den Fehlerspeicher ein.

Hinweis: Während des Einschaltens kann der Digitalablenkprozessor die HFB und VFB nicht kontrollieren. Damit dennoch das Verhalten der HFB-Impulse während des Einschaltens überprüft werden kann, ist die Schaltung um Op-Amp IC7360 vorhanden (siehe die Einschalt-Schutzschaltung).

6.4.3 *Einschalt- Schutzschaltung (Reihenschaltertest)*

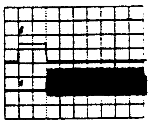
Beim Einschalten des Gerätes wird der Reihenschalter TS7470 durch den Op Amp IC7360 auf der Digitalablenkprozessor-Platine getestet. Wenn der Reihenschalter TS7470 nicht einwandfrei funktioniert, wird Fehler 47 erzeugt.

Das Einschaltverfahren geht normalerweise folgendermaßen vonstatten:

1. Einschalten der Versorgungsspannungen (also auch die +5V und +8V des Digitalablenkprozessors).
   → Die 'PROT-Line' wird 'high' (aktiv) über Op Amp IC7360 auf der Digitalablenkprozessor-Platine (Ausgangspin 1 des Op Amp IC7360 wird 'high', wenn keine HFB-Impulse vorhanden sind; dieser Ausgang ist über Diode 6334 an die 'PROT-Line' gekoppelt).
2. Etwa 800 ms, nachdem die Versorgungsspannungen vorhanden sind, schaltet der Digitalablenkprozessor ein (HDRIVE) und versucht, die Zeilenendstufe anzusteuern.
   → Der Digitalablenkprozessor mißt das Vorhandensein der HFB-Impulse; diese Impulse dürfen nicht vorhanden sein, wenn der Reihenschalter noch geöffnet ist.
   → Nur wenn kein HFB-Impuls anliegt, also der Reihenschalter keinen Kurzschluß hat, bleibt die 'PROT-Line' 'high' (aktiv).
3. Nur wenn die 'PROT-Line' etwa 200 ms nach dem Einschalten des HDRIVE immer noch 'high' ist, schließt die Software den Reihenschalter TS7470 (d.h. in der fehlerfreien Situation wird der Reihenschalter etwa 1000 ms nach dem Vorhandensein der Versorgungsspannungen geschlossen).
   → Die HFB-Impulse müssen jetzt vorhanden sein (folglich ist jetzt der Reihenschalter geschlossen).
4. Nur wenn der HFB vorhanden ist (Zeile ist in Ordnung und Reihenschalter folglich geschlossen), wird die 'PROT-Line' 'low', da sowohl der Digitalablenkprozessor und der Op Amp IC7360 HFB-Impulse empfangen.
5. Alles OK.

Einwandfreie Situation

B = 5V/div 'Prot-Line' an 7L11
A = 10V/div (35Vtt) HFB an Meßpunkt L4
Zeitbasis 0,5S/div



Praktisch bedeutet dies:

- Wenn der Reihenschalter ständig geschlossen (folglich defekt) ist, liegen Rücklauf(HFB)-Impulse bereits an Punkt 2 an. Hierdurch wird die 'PROT-Line' bereits bei Punkt 2 'low' (bereits 800 ms nach dem Vorhandensein der Versorgungsspannungen). Der Hauptprozessor gibt dem Stand-by(-I/O)-Prozessor den Befehl, das Netzteil auf Stand-by-Betrieb zu schalten, und trägt Fehler 47 in den Fehlerspeicher ein.
- Wenn die HFB-Impulse nach dem Schließen des Reihenschalters TS7470 abwesend bleiben, bleibt die 'PROT-Line' 'high' (Punkt 3). Die Zeilenablenkung schaltet augenscheinlich nicht einwandfrei ein, oder der Reihenschalter schließt nicht. Der Stand-by(-I/O)-Prozessor schaltet dann das Netzteil auf Stand-by-Betrieb. Auch in diesem Fall wird Fehler 47 in den Fehlerspeicher eingetragen.

Achtung: Dies bedeutet, daß Fehlerkode 47 erzeugt wird, wenn die Zeilenablenkung nicht einwandfrei einschalten kann. Falls also beim Einschalten Probleme in der Zeilenablenkung entstehen, wird immer Fehlerkode 47 in den Fehlerspeicher eingetragen. Weitere Fehlerkode im Fehlerspeicher wie Fehlerkode 48 (Hardware-Schutz) und Fehlerkode 69 (Horizontalstörung) zeigen an, daß die Störung während des normalen Betriebs aufgetreten ist. Der nächste Einschalt-Versuch wird mißlingen, und Fehlerkode 47 wird in den Speicher eingetragen.
Somit wird ein Fehlerkode 47 im Fehlerspeicher meistens nicht durch einen defekten Reihenschalter TS7470 verursacht, sondern hat eine andere Ursache im Zeilenablenkteil.

Hochspannungsschutzschaltung (Überschlag)
Eine spezielle Schutzschaltung ist die Hochspannungsschutzschaltung. Nach einem 'Überschlag' in der Bildröhre schaltet diese Schutzschaltung die Zeilen-Ablenkendstufe durch das FAST-DOWN-Signal aus. Auf der Digitalablenkprozessor-Platine erfaßt der Stromkreis um TS7390, 7391 und 7392 herum ein schnelles Abfallen der Spannung 'EHT-Info'. Die Spannung auf dieser Verbindung wird während eines Überschlages negativ. Über die oben aufgeführten Transistoren wird die FAST-DOWN-Verbindung 'high', und dadurch wird die Versorgung der Zeilen-Ablenkendstufe abgeschaltet, bevor ein höherer Strom den Zeilenablenkkreis beschädigen kann. Da ein Überschlag in der Bildröhre etwas Vorübergehendes ist, schaltet die Zeilen-endstufe sofort wieder ein. Der Fehler ist sehr kurz und wird vom Hauptprozessor nicht anerkannt (falscher Alarm). Innerhalb von weniger als 0,5 Sekunden schaltet die Zeilenendstufe wieder ein.

6.4.6 *Rest der Schutzschaltungs-Übersicht*

Die vom Zeilentransformator erzeugten Spannungen:
Die Zeilenendstufe erzeugt verschiedene Sekundärspannungen:
- +13V-Zeilentransformator zur Bildröhrenplatine (Pin 8);
- -15V-Zeilentransformator zum Digitalablenkprozessor und zur Bildröhrenplatine (Pin 9 des Zeilentransformators);
- Die Heizfadenspannung für die Bildröhre (Pins 11 und 12);
- Die +200V für die RGB-Endstufen (Pin 7);
- Die Versorgung der Bildlageschaltung (Pins 4 und 7);
- Die Hochspannung wird durch ein Diodensplitting erzeugt. Die Focus-und die VG2-Spannung werden von der Hochspannung abgeleitet. Die Focus- und VG2-Potentiometer sind in den Zeilentransformator integriert.

Der Strahlstrom fließt von den 141V durch R3450 und 3451. Bei steigendem Strahlstrom nimmt die Spannung an Pin 10 des Zeilenablenktransformators ab, dadurch sinkt auch die Spannung über C2450 ab.

6.5 Fehlersuche und Reparaturtips

Siehe die Fehlersuch-Bäume auf Seite 8.

6.5.1 *Allgemeines*

1. Bei den meisten Störungen haben Geräte mit MD2 kein Bild und keinen Ton; das Gerät ist im Schutzschaltungsmodus (Netzteil ist auf Stand-by geschaltet, so daß das gesamte Gerät, bis auf den Stand-by(-I/O)-Prozessor, ausgeschaltet ist).
2. **Indikation nach Leuchtdiodenanzeige nach dem Einschalten (siehe Fehlersuche-Baum):**
   - Keine Leuchtdioden:
     Problem in Versorgung oder Mikroprozessor.
   - Beide Leuchtdioden leuchten ununterbrochen:
     Steuerteil oder Stand-by-Modus defekt.
   - Rote Leuchtdiode blinkt langsam (1,25Hz):
     Schutzschaltung (Hauptprozessor oder +5V2).
   - Rote Leuchtdiode leuchtet ununterbrochen:
     Steuerung (μP), RC oder RC5 defekt.
   - Rote Leuchtdiode blinkt schnell (5Hz):
     Schutzschaltung (alle anderen Fehler).
   - Grüne Leuchtdiode leuchtet ununterbrochen:
     Netzteil und Mikroprozessoren sind in Ordnung.

   Das Gerät über den Netzschalter einschalten. Wenn die Leuchtdioden sich normal verhalten, ist der Mikroprozessor wahrscheinlich in Ordnung. Die grüne Leuchtdiode zeigt an, daß das Netzteil eingeschaltet ist. Wenn nach einigen Sekunden die Stand-by-Leuchtdiode blinkt, wurde ein Fehler erfaßt. Dann wird die Versorgung wieder auf Stand-by-Betrieb geschaltet. Neustart ist nur über den Netzschalter oder die internen Servicepins möglich.
3. Hörbare Überprüfungen:
   - Kann man die Entmagnetisierung hören? Ja: Netzspannung liegt an der Netzeingangsplatine an.
   - Kann man die Hochspannung hören? Ja: die Versorgung ist in Ordnung (Digitalablenkprozessor und Zeilen-Ablenkendstufe funktionieren nur, wenn VOS (141V) in Ordnung ist).
   - 'Pumpen' im Netzteil? Netzteil ist kurzgeschlossen. Zeilentransformator, Reihenschalter TS7470 und Zeilentransistor TS7421 kontrollieren.
4. Fehlerkodes
   Wenn Fehlerkode 48 angezeigt wird, war der Schutzschaltung wirksam und wurde von der 'PROT-Line' ausgelöst. Das Lesen des folgenden Fehlerkodes kann weitere Informationen über den Defekt geben. Wenn der zweite Fehlerkode z.B. 69 H-FAIL ist (vom Digitalablenkprozessor erfaßt, weil die HFB-Impulse nicht die richtige Form haben), dann wissen wir, daß die Zeilenablenkung nicht einwandfrei funktioniert. Fehler 18 zeigt an, daß der Digitalablenkprozessor nicht mit dem Hauptprozessor kommuniziert. Höchstwahrscheinlich funktioniert das Netzteil nicht oder ist kurzgeschlossen.

   Einige wichtige Möglichkeiten für die Anzeige des Fehlerspeichers:

44 47	Zeilenendstufenfehler während des EinschaltensodervordemEinschalten
44 48 69	Zeilenendstufenfehler während des normalen Betriebs
47 44 48 69	Zeilenendstufenfehler während des normalen Betriebs und nach einem Neustart-Versuch.

   Zeilenendstufenfehler können sein:
   * Reihenschaltertest (dieser Fehler kann nur beim Einschalten erzeugt werden)
   * Ost/West-Schutzschaltung (EW_PROT)
   * HFB-Ausfall

   Siehe Abschnitt 6.5.3 für eine Methode der Fehlersuche innerhalb der Zeilenendstufe.

44 48 70	Vertikalfehler (Fehler kann beim Einschalten oder vor dem Einschalten oder während des normalen Betriebs auftreten)
44 48 71	Hochspannungs-Info-Problem (zu hoher Strahlstrom), z.B. +200D nicht vorhanden oder einer der RGB-Verstärker ist kurzgeschlossen (Fehler kann beim Einschalten oder vor dem Einschalten oder während des normalen Betriebs auftreten)
44 (45) 51 82	I^2C-Bus kurzgeschlossen, oder SCL ist kurzgeschlossen oder SDA ist kurzgeschlossen. Bei solchen I^2C-Bus Problemen zeigt der Fehlerspeicher immer 44 51 82 an, nachdem der Fehlerspeicher gelöscht und dann wieder eingeschaltet wurde.

5. Serienschalter-Einschaltschutz (Fehler 47) und +8V-Schutz (Fehler 45)
   Wenn das Gerät sich in diesem Schutz-Modus befindet (Netzteil auf Stand-by), den SDM oder SAM über die Service-Pins auf der Bestückungsseite der Kleinsignalplatine einschalten.
6. Mikroprozessorproblemen
   Bei Mikroprozessorproblemen läßt sich anhand der Form des 'MAIN_IS_ALIVE'-Signales feststellen, ob der Hauptprozessor, der Stand-by(-I/O)-Prozessor oder die +5V2 das Problem verursacht haben. Das 'MAIN_IS_ALIVE'-Signal muß an Pin 36 des Stand-by(-I/O)-Prozessors gemessen werden.

Fehlerkodes, Schutzvorrichtungen, Fehlersuche und

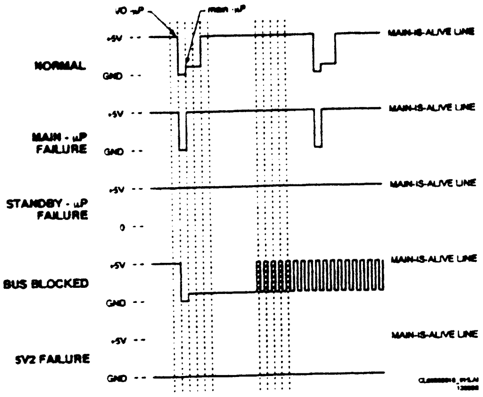


Abb. 6.5

Wenn also:

a Impulse ohne 0V3-Schritte
  → Hauptprozessorstörung
b Immer 5V2, keine Impulse
  → Störung des Stand-by(-I/O)-Prozessors
c Immer 0V, keine Impulse
  → +5V2 nicht vorhanden

7. Dolby
   Bei Dolby-Geräten können sowohl die Clickfit- also auch die Surround-Ton-Platinen überbrückt (herausgenommen) werden, indem der Lautsprecherstecker in L38 gesteckt wird, statt in U36.

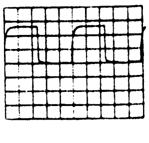
6.5.2 *Fehlersuche im Netzteil*

Bei Problemen mit dem Netzteil kann das Netzteil separat und mit niedrigen Spannungen (geringes Risiko) betrieben werden. Hierzu folgendermaßen vorgehen:

Steuerteil des Netzteils

1. Die Stecker der Kleinsignalplatine trennen, so daß die Zeilenendstufe nicht mehr angesteuert werden kann, oder trenne die Zeilenendstufe ab durch entfernen der Brücke 9471.
2. Ein externes Gleichstrom-Netzteil anschließen zwischen Versorgungspin 1 von IC7520 (über eine Diode - z.B. BYD33D - mit Kathode an Versorgungspin 1 IC7520) und heißer Erde (z.B. Erde des großen Glättungskondensators C2505).
3. Ein Oszilloskop an Meßpunkt P5 (Pin 3 IC7520) anschließen.
4. Die externe Versorgungsgleichspannung langsam auf 17V Gleichspannung erhöhen.
   Hinweis: Der IC startet bei einer Versorgungsspannung von etwa 14V Gleichspannung, danach kann die Versorgungsspannung auf etwa 9V Gleichspannung abfallen.
   Bei etwa 18V Gleichspannung wird der Überspannungsschutz aktiv, und dann muß die Versorgungsspannung zunächst unter 7V Gleichspannung fallen, bevor ein Neustart ausgeführt wird, indem die Versorgungsspannung auf mehr als 14V Gleichspannung gestellt wird.
5. Ist das Steuerteil des Netzteils in Ordnung, so muß das Oszillogramm aussehen wie unten abgebildet. Wenn dies nicht der Fall ist, kann das Steuerteil des Netzteils (IC7520 oder die Peripherie an Pins 9, 10 oder 11) defekt sein.

A = 5V/div
Zeitbasis = 5µS/div
→ 40kHz Impulse



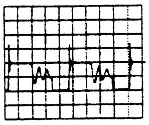
Belastungstest des Netzteils (nur bei einwandfreiem Steuerteil):

6. Schritt 1, 2 und 4 ausführen (sofern noch nicht erfolgt).
7. Eine Lampe von 220V 100W über den VOS-Ausgangskondensator C2569 anschließen.
8. Einen 1k-Widerstand zwischen die +8S (Stecker 4L10) und die STANDBY-Verbindung anschließen (zwischen R3595 und R3596), so daß das Netzteil auf normalen Betrieb geschaltet wird.
9. Das Netz an einen Stelltrafo anschließen, aber auf 0V lassen.
10. Einen Spannungsmesser über C2569 und ein Oszilloskop über den Drain-Anschluß von TS7541 und heiße Erde anschließen.
11. Die Netzeingangsspannung mit dem Stelltrafo langsam erhöhen (so kann das Netzteil nicht weiter beschädigt werden).
    Die abgebildeten Oszillogramme sind bei folgenden Netzspannungen gemessen:

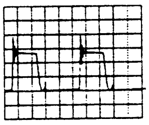
Netzeingangsspannung über Stelltrafo:

10V AC:	20kHz und VOS 7V5
20V AC:	40kHz und VOS 30V
40V AC:	40kHz und VOS 80V
65V AC:	40kHz und VOS 140V
>65V AC:	Stabile Lage, also 40kHz und 140V

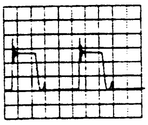
1. 10V Netzeingangsspannung:
   A = 10V/div
   Zeitbasis = 10µS/div
   → 20kHz Impulse
   → VOS 7V5



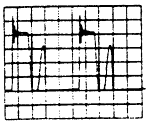
2. 20V Netzeingangsspannung
   A = 20V/div
   Zeitbasis = 5µS/div
   → 40kHz Impulse
   → VOS 30V



3. 40V Netzeingangsspannung
   A = 50V/div
   Zeitbasis = 5µS/div
   → 40kHz Impulse
   → VOS 80V



4. 65V Netzeingangsspannung
   A = 50V/div
   Zeitbasis = 5µS/div
   → 40kHz Impulse
   → VOS 140V



Ein genauerer Fehlersuch-Baum für dieses Netzteil befindet sich in der MD1-Service-Anleitung und in den Service-Informationen. Hierzu ist anzumerken, daß das MD2-Netzteil im Prinzip mit dem MD1-25-28"-Netzteil identisch ist (nicht identisch mit dem MD1-21"-Netzteil !).

6.5.3 *Fehlersuche in der Zeilenablenkung*

Die HFB-Impulse (Meßpunkt L4 oder zwischen C2419 und C2420) und die 'PROT-Line' (z.B. an Anschluß 7L11) sind sehr informative Meßpunkte für mögliche Störungen in der Zeilenablenkung. Eine geeignete Vorgehensweise ist:

A. Kontrollieren Sie den DDP (HDRIVE);
B. Zunächst die HFB-Impulse und die 'PROT-Line' unter normalen Bedingungen kontrollieren (220V-Netzeingangsspannung und HDRIVE über Digitalablenkprozessor);
C. Falls sich das Problem in der Zeilenablenkung selbst befindet, kann man die Zeilenablenkung mit einer externen Stromversorgung und einer externen Ansteuerung testen und reparieren.

Service-Modi, Händlerfernbedienung, Fehlerkodes,

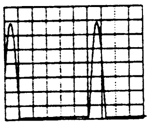
Wenn die Zeilenablenkung selbst defekt ist

Wenn die Zeilenablenkung selbst defekt ist, kann die Zeilenablenkung mit einer externen Stromversorgung und einer externen Ansteuerung geprüft werden:

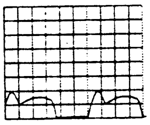
1. Den Netzstecker ziehen.
2. Die Kleinsignalplatine abtrennen.
3. Eine externe 40-50V-Gleichspannungsversorgung mit der Möglichkeit zur Strommessung zwischen der Ausgangsseite des Reihenschalters TS7470 und der Erde anschließen.
4. Den HDRIVE-Impuls des Digitalablenkprozessor durch das Signal eines externen Niederfrequenz-Generator ersetzen (TTL-Pegel, also zwischen 0 und 5V und Einschaltdauer 50%, 32kHz), dabei das Signal mit der Kathode von D6409 (neben dem Zeilenablenktransformator an der Seite des PCBs) verbinden.
5. Ein Oszilloskop an Meßpunkt L1 (Kollektor von Zeilentransistor TS7421) anschließen.

Möglichkeiten:

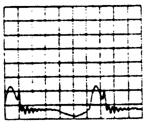
1. A = 50V/div Meßpunkt L1 an Kollektor des ZeileNtransistors
   Zeitbasis 5µS/div
   Strom von externer Gleichstromversorgung etwa 100mA
   Wenn bei 32kHz-Impuls ca. 100mA Speisestrom gemessen werden:
   → Einwandfreier Zeilenkreis
   Die Amplitude des Signals hängt stark von der Frequenz des Generators ab.



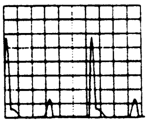
2. A = 50V/div Meßpunkt L1 an Kollektor des Zeilentransistors
   Zeitbasis 5µS/div
   Strom von externer Gleichstromversorgung etwa 100mA
   Wenn die Impulse niedriger sind und kurze von langen Impulsen gefolgt werden, und dabei etwa 100mA Speisestrom zu messen sind:
   → Zeilenablenkung unterbrochen, also z.B.:
   - **Zeilenablenkspule unterbrochen**
   - **Linearitätsspule L5421 unterbrochen**
   - **S-Korrektur C2432 unterbrochen**



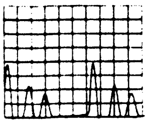
3. A = 50V/div Meßpunkt L1 an Kollektor des Zeilentransistors
   Zeitbasis 5µS/div
   Strom von externer Gleichstromversorgung etwa 500mA !!
   Wenn hohe Frequenzen zu messen sind (s.Abb.) und 500mA Speisestrom fliessen:
   → Zeilenablenkung kurzgeschlossen (z.B. Zeilenablenkspule kurzgeschlossen)
   Wenn die Zeilenablenkung nicht völlig kurzgeschlossen ist, sondern lediglich einige Wicklungen, dann erscheint das Oszillogramm ohne die Schwingungen und einen Strom der externen Gleichstromversorgung von etwa 200mA.



4. A = 100V/div Meßpunkt L1 an Kollektor des Zeilentransistors
   Zeitbasis 5µS/div
   Strom von externer Gleichstromversorgung etwa 150mA
   Wenn die Rücklaufzeit kürzer ist, dazwischen zusätzliche Impulse, 150mA Speisestrom
   → Rücklaufkondensator C2425 unterbrochen



5. A = 100V/div Meßpunkt L1 an Kollektor des Zeilentransistors
   Zeitbasis 5µS/div
   Strom von externer Gleichstromversorgung > 1A
   Wenn 2 zusätzliche Impulse pro Zyklus zu messen sind und der Speisestrom mehr als 1A beträgt:
   → Kurzschluß in Bildröhre (z.B. Hochspannung zu Aquadag)



6.5.4 *Fehlersuche im Synchronisierungsteil (siehe auch Fehlersuche-Baum)*

1. TXT/OSD-Menü ist stabil (OK), wenn die Antenne nicht eingesteckt ist:
   - ⋆ Digitalablenkprozessor und Zeile scheinen in Ordnung
   - ⋆ Wahrscheinlich Synchronisierungsproblem im Bilddekoder IC 7352 (HA, VA) oder in der Feature-Box (HD, VD)
2. TXT/OSD-Menü ist nicht stabil (rollt), wenn die Antenne nicht eingesteckt ist:
   - ⋆ Absolut keine Synchronisierung, also Digitalablenkprozessor-oder Zeilenablenkungsstufenproblem

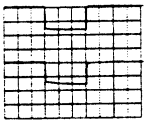
6.5.5 *Fehlersuche Kein-Bild-und-kein-Schutz-Leuchtdiode —> Problem im Bildreglerteil (TDA4780)*

Wenn kein Bild und kein Schutz vorhanden ist, liegt das Problem wahrscheinlich in der BC_INFO begründet (TDA4780 oder RGB-Verstärker oder Bildröhre).

Normales Startverfahren:
Einen Bildgenerator (z.B. PM5518) mit einem weißen Muster an den Tuner anschließen, und die Oszilloskopfeldfrequenz triggern (ein stabileres Bild erhält man durch Triggern am VD der Feature-Box; Pin 6 S48).

1. Erste Phase des Startverfahrens: 4 weiße Meßzeilen (Zeilen 15, 16, 17, 18) und das Hauptbild ist gedämpft (diese Oszillogramme kann man am besten sehen, wenn die Bildröhre kalt ist);

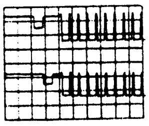
   Rot- und Grün- (oder Blau-) Elektronenstrahlsystem
   100V/div Gleichstrom
   50µs/div
   4 Meßzeilen weiß



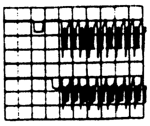
   Gesamtstrahlstrom wird gemessen, und Rückkopplung an Pin 19 TDA4780.
   Der TDA4780 kontrolliert, ob die Spannung an Pin 19 TDA4780 (IC7500) ≥ 4V5 ist (während dieser Zeilen)
   Ja —> weiter bei Phase 2
   Nein —> in Phase 1 bleiben

2. Zweite Phase des Startverfahrens: jeder Strahl wird einzeln gemessen, und das Hauptbild ist noch immer gedämpft. Zeile 15 ist rot, Zeile 16 ist grün und Zeile 17 ist blau. Jetzt wird die BC_INFO gemessen:
   - ⋆ Unterschiede werden kompensiert
   - ⋆ Wenn Unterschiede minimal sind, dann weiter bei Phase 3

Rot- (Zeile 15) und Grün- (Zeile 16) Elektronenstrahlsystem
50V/div Wechselstrom
50µs/div



Rot- (Zeile 15) und Blau- (Zeile 17) Elektronenstrahlsystem
50V/div Wechselstrom
50µs/div



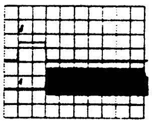
Reparaturtips

HFB-Impuls und PROT-Line Messungen beim Einschalten unter normalen Bedingungen (220V Netzspannung und HDRIVE über Digitalablenkprozessor):

1. Ein Oszilloskop an das PROT-Line-Signal (Anschluß 7L11) und den HFB-Meßpunkt L4 anschließen (ein stabiles Oszilloskopbild erhält man durch Triggern des Oszilloskops bei der steigenden oder fallenden Flanke des PROT-Line-Signals und, wenn nötig, einstellen einer Verzögerung).
2. Bei Problemen in der Zeilenendstufe ist normalerweise eine Schutzschaltung im Gerät wirksam. Alle im Folgenden aufgeführten Messungen erfolgen im Einschaltmoment, so daß das Schutzschaltungsverhalten beobachtet werden kann. Nach jeder neuen Messung dem Gerät einige Sekunden Zeit geben, die Schutzschaltung zurückzusetzen.

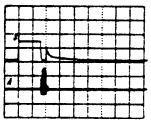
Möglichkeiten:

1. B = 5V/div PROT-Line an 7L11
A = 10V/div (35Vtt) HFB an Meßpunkt L4
Zeitbasis 0,5S/div



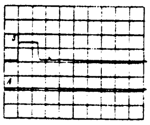
Wenn das 'Prot-line'-Signal 1000 ms lang 'high' ist (8V), und dann das HFB-Signal vorhanden ist:
→ **Fehlerfreie Situation**
Siehe Abschnitt 6.4.3

2. B = 5V/div PROT-Line an 7L11
A = 10V/div (35Vtt) HFB an Meßpunkt L4
Zeitbasis 0,5S/div.



Wenn das 'Prot-Line'-Signal 800ms lang'high' ist (8V), dann 200ms lang HFB-Impulse meßbar sind:
→ **Reihenschalter kurzgeschlossen**
Hinweis: Amplitude in Ordnung (35Vtt), folglich auch Zeilenablenkung in Ordnung. Direkt nach dem Einschalten des Netzschalters erscheinen nach etwa 800 ms für die Dauer von etwa 200 ms Impulse, dann wird der Schutz aktiviert. Siehe auch Abschnitt 6.4.3; wenn der Reihenschalter kurzgeschlossen wird, sind bereits nach 800 ms HFB-Impulse vorhanden, und der Digitalablenkprozessor macht die 'PROT-Line' 'low'. Da die PROT-Line bereits nach 800 ms Low-Pegel führt, schaltet das Gerät in den SchutzschaltungsModus.

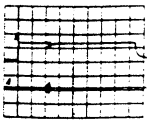
3. B = 5V/div PROT-Line an 7L11
A = 10V/div (35Vtt) HFB an Meßpunkt L4
Zeitbasis 0,5S/div



Wenn das 'Prot-Line'-Signal 4 Sekunden lang 'high' ist (8V) und kein HFB-Signal zu messen ist:
→ * **Reihenschalter unterbrochen, oder**
* **Zeilentransistor unterbrochen, oder**
* **keine Horizontalansteuerung (HDRIVE)**
Siehe auch Abschnitt 6.4.3; nach 1000 ms versucht der Prozessor, den Reihenschalter zu schließen, dieser ist jedoch defekt (unterbrochen), und folglich werden keine HFB-Impulse am Digitalablenkprozessor gemessen. In diesem Fall wartet die Software weitere 3000 ms lang auf HFB-Impulse. Wenn die Impulse auch nach diesen 3000 ms noch nicht da sind, schaltet das Gerät in den Schutzschaltungs-Modus.

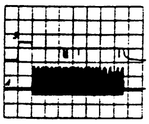
4. HFB-Impulse und PROT-Line beim Einschalten beide auf Null. Netzteil ist kurzgeschlossen, pumpt folglich, keine Ausgangsspannung.
→ **Kurzschluß am Reihenschalter und an der Betriebsspannung VOS (z.B. Zeilentransistor TS7421 oder die beiden Dioden D6421 und 6422 defekt).**

5. B = 5V/div PROT-Line an 7L11
A = 10V/div (35Vtt) HFB an Meßpunkt L4
Zeitbasis 0,5S/div



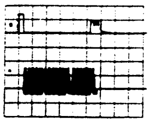
Wenn 4 Sekunden lang PROT-Line 'high' (8V) und kurz ein HFB-Impuls meßbar:
→ * **Reihenschalter, Zeilentransistor und HDRIVE in Ordnung**
* **Keine Zeilenablenkung (z.B. Horizontalablenkspule nicht angeschlossen oder unterbrochen)**
Siehe auch Abschnitt 6.4.3; nach 1000 ms wird der Reihenschalter geschlossen, aber das HFB-Signal ist nicht korrekt. Die kurz meßbare Schwingung bei 32kHz zeigt an, daß Reihenschalter, Zeilentransistor und HDRIVE in Ordnung sind.

6. Zwei Phänomene sichtbar:
a Kein Bild, kein Ton; nach etwa 5 Sekunden sehr kurz ein horizontaler Strich, und dann schaltet das Gerät auf Schutz-Modus
b B = 5V/div PROT-Line an 7L11
A = 10V/div (35Vtt) HFB an Meßpunkt L4
Zeitbasis 1S/div



Wenn sehr kurze Zeit ein horizontaler Strich zu sehen ist, und 1 Sekunde lang'PROT-Line' 'high' (8V) ist, kein VFB-Signal zu messen ist und dann 7 Sekunden lang PROT hoch (5V)
→ **Keine Vertikalablenkung (z.B. Ablenkspule nicht angeschlossen)**
Einschaltverfahren (1000ms PROT auf 8V) ist in Ordnung. Danach wird der Reihenschalter geschlossen. In diesem Fall sind HFB-Impulse normal vorhanden, da jedoch keine VFB-Impulse vorhanden sind (Digitalablenkprozessor erzeugt Fehler 70 V_FAIL), wird die PROT-Zeile aktiv, angesteuert vom Digitalablenkprozessor (7 Sekunden lang wird die PROT-Line vom Digitalablenkprozessor auf 5V gesteuert).

7. Zwei Phänomene sichtbar:
a Sehr helles Bild mit noch helleren Rücklaufzeilen. Nach etwa 10 Sekunden schaltet das Gerät in den Schutzschaltungs-Modus.
b B = 5V/div PROT-Line an 7L11
A = 10V/div (35Vtt) HFB an Meßpunkt L4
Zeitbasis 2S/div



Wenn ein sehr helles Bild mit noch helleren Rücklaufzeilen erscheint, und 1 Sekunde lang die 'PROT-Line 'high' (8V) ist, dann etwa 8 Sekunden die 'PROT-Line' 'low' ist, HFB-Impulse meßbar sind und dann 1 Sekunde lang die 'PROT-Line' 'high' (5V) ist:
→ * **Keine +200D Spannung**
* **RGB-Verstärker kurzgeschlossen**
Einschaltverfahren (1000ms PROT-Line auf 8V) ist in Ordnung. Etwa 8 Sekunden lang nach diesem Einschaltverfahren macht der Digitalablenkprozessor die PROT-Line 'high' (5V), weil die Hochspannungs-Info zu hoch ist (Digitalablenkprozessor erzeugt Fehler 71, Strahlstrom zu hoch). Nach 1 Sekunde 'PROT-Line'= 'high' schaltet das Gerät in den Schutzschaltungs-Modus.

3. Nach dem Einschalten ist das Bild vorhanden, und unterschiedliche Grenzwerte für das R-, das G- und das B-Elektronenstrahlsystem werden ständig kompensiert

Reparaturverfahren

Wenn kein Bild und keine Fehlerkodes vorhanden sind:
- Das Gerät einschalten.
- Bei einem 4x3-Gerät Kompression (16:9) drücken.
- Bei einem 16x9-Gerät das Bild nach unten verschieben.

Jetzt kann man sehen, in welcher Einschaltphase sich das Gerät befindet:

1. **Eine helle weiße Linie**
   (erste Phase des Einschaltverfahrens)
   → es ist ein Monitorimpuls vorhanden, folglich sind TDA4780 + Bildröhre + RGB-Verstärker in Ordnung
   → an Pin 19 TDA4780 muß eine 4V5-Rückkopplung anliegen
   → Wenn keine 4V5, dann Störung in Rückkopplungsschleife

2. **Kleine R- und G- und B-Linien**
   (zweite Phase des Einschaltverfahrens)

   TDA4780 ist in Ordnung

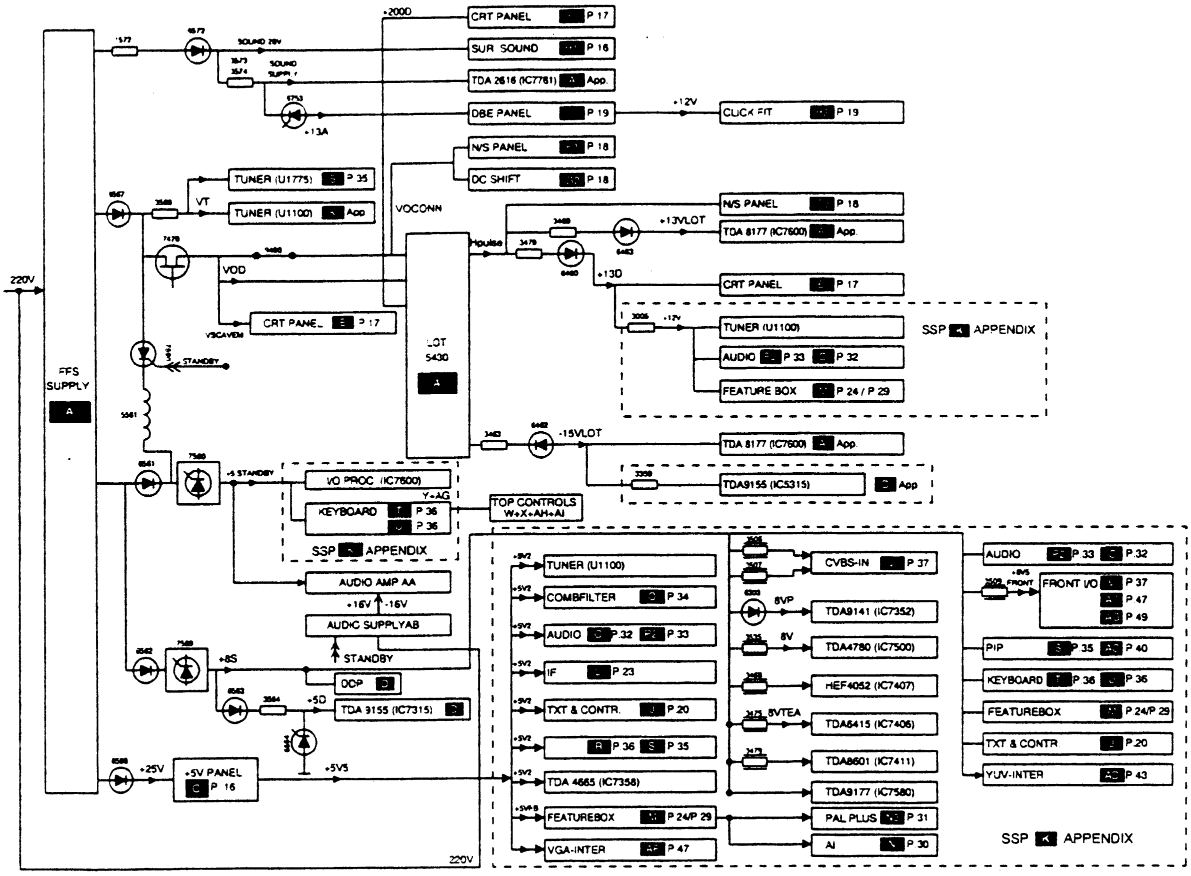
   Wahrscheinlich ist ein Elektronenstrahlsystem der Bildröhre nicht in Ordnung
   → An Pin 19 TDA4780 messen, welche Rückkopplungslinie (die R- oder G- oder B-Linie) am kleinsten ist; der Fehler liegt im betreffenden Elektronenstrahlsystem (Verstärker oder Elektronenstrahlsystem)

3. **Keine Linien zu sehen**
   Pin 19 TDA4780 messen

- 0V	TDA4780 überprüfen (Sandcastle und Versorgungsspannung)
- 5V	RGB-Verstärker überprüfen Pin 19 TDA4780 kurzschließen, jetzt erscheinen Meßlinien (bei constant 5V werden Phase 1 und 2 überbrückt)
- Impulse	Es gibt Meßzeile vorhanden, folglich ist TDA4780 in Ordnung. An Kathode an der Bildröhrenplatine messen, ob die Meßzeilen vorhanden sind: Ja → BC_IN FO-Schalt ung ist offen, oder keine HEIZFADEN -Spannung Nein → RGB-Verstärker-Problem

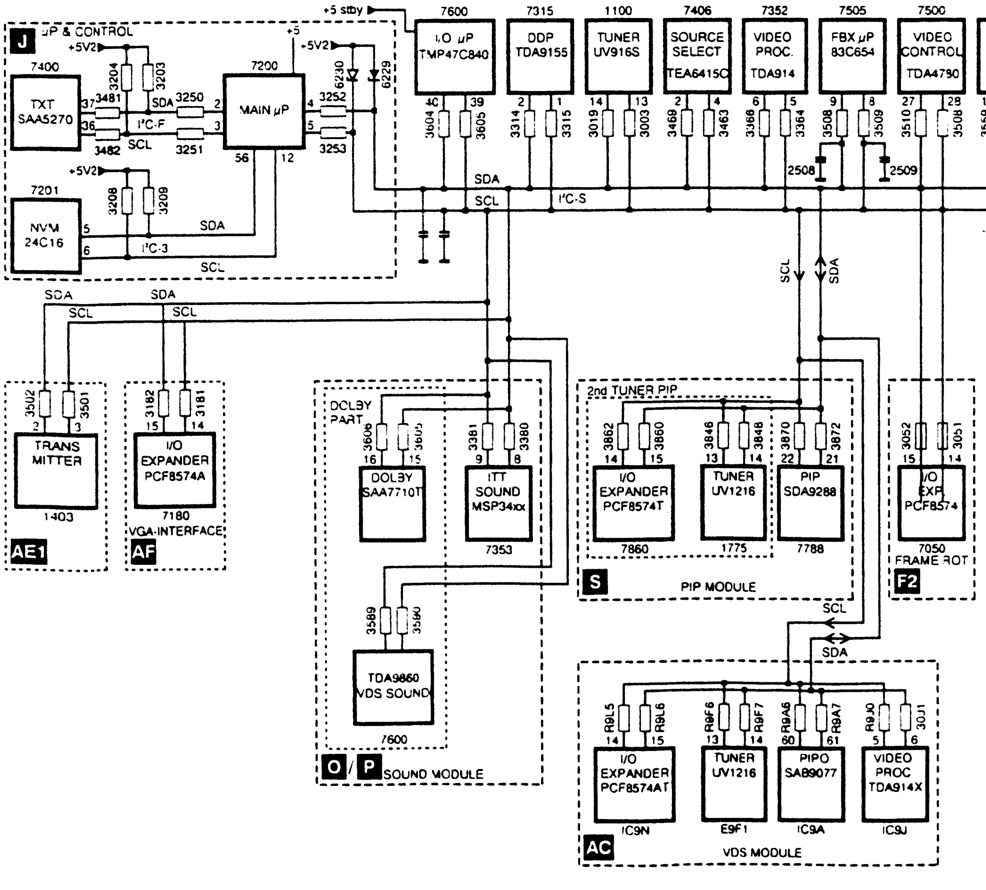
Reparaturtips

Blockschaltbild Speisespannungen



220V
FFS SUPPLY
A
LOT 5430
A
VOCONN
VOD
CRT PANEL P 17
SUR SOUND P 16
TDA 2616 (IC7761) App.
DBE PANEL P 19
+12V
CLICK FIT P 19
N/S PANEL P 18
DC SHIFT P 18
TUNER (U1775) P 35
TUNER (U1100) App
VT
N/S PANEL P 18
TDA 8177 (IC7600) App.
+13VLOT
+13D
CRT PANEL P 17
TUNER (U1100)
AUDIO P 33 P 32
FEATURE BOX P 24 / P 29
SSP APPENDIX
-15VLOT
TDA 8177 (IC7600) App
TDA9155 (IC5315) App
+13A
STANDBY
+5 STANDBY
I/O PROC (IC7600)
KEYBOARD P 36 P 36
Y+AG
TOP CONTROLS W+X+AH+AI
SSP APPENDIX
AUDIO AMP AA
+16V -16V
AUDIO SUPPLYAB
STANDBY
+8S
DCP
+5D
TDA 9155 (IC7315)
+25V
+5V PANEL P 16
+5V5
220V
TUNER (U1100)
COMBFILTER P 34
AUDIO P 32 P 33
IF P 23
TXT & CONTR. P 20
P 36 P 35
TDA 4665 (IC7358)
FEATUREBOX P 24/P 29
VGA-INTER P 47
CVBS-IN P 37
8VP
TDA9141 (IC7352)
8V
TDA4780 (IC7500)
HEF4052 (IC7407)
8VTEA
TDA8415 (IC7406)
TDA8601 (IC7411)
TDA9177 (IC7580)
PAL PLUS P 31
AI P 30
AUDIO P 33 P 32
FRONT I/O P 37 P 47 P 49
PIP P 35 P 40
KEYBOARD P 36 P 36
FEATUREBOX P 24/P 29
TXT & CONTR P 20
YUV-INTER P 43
SSP APPENDIX

I²C baum



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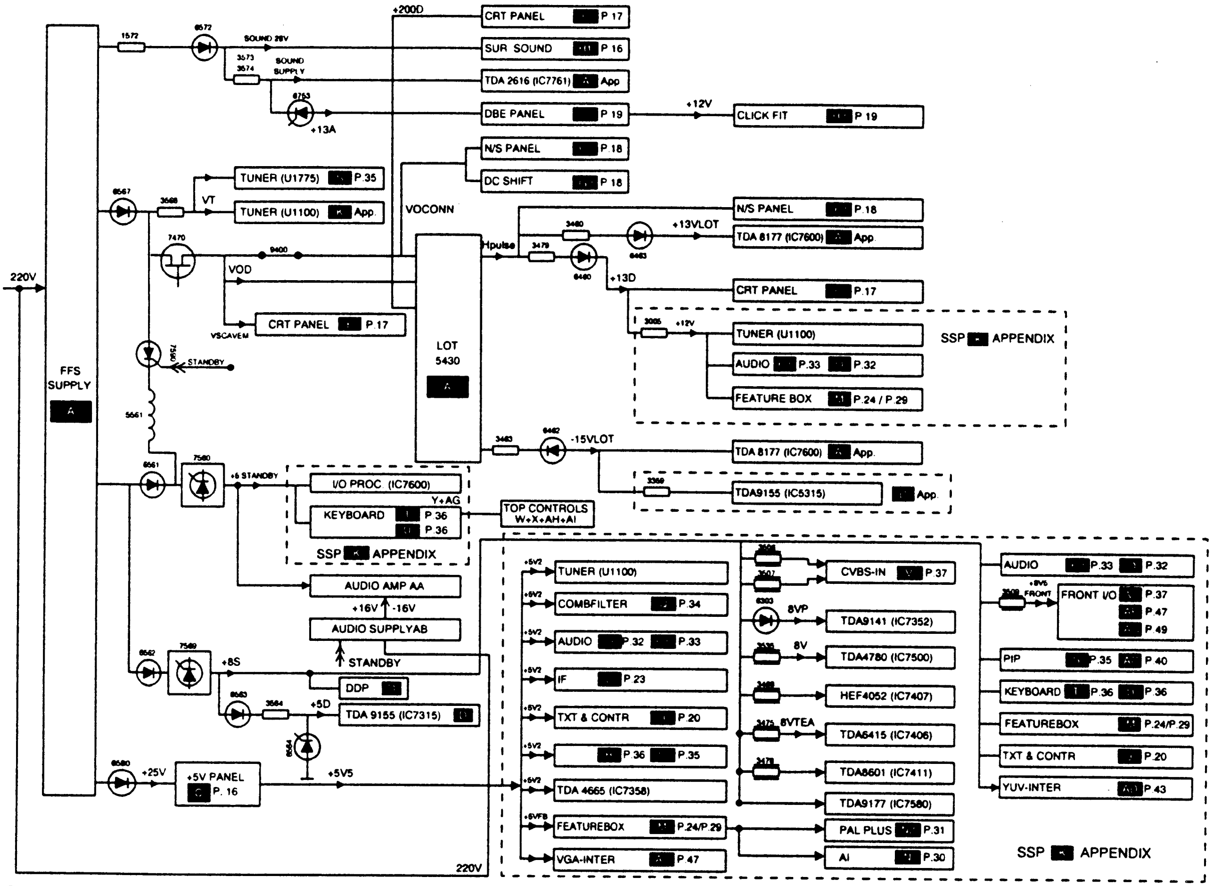
7400 TXT SAA5270
7200 MAIN µP
7201 NVM 24C16
3204 3203 3481 3482 3250 3251 3252 3253 3208 3209 6230 6229
SDA SCL I²C-F I²C-3 +5V2 +5
7600 I/O µP TMP47C840
7315 DDP TDA9155
1100 TUNER UV916S
7406 SOURCE SELECT TEA6415C
7352 VIDEO PROC. TDA914
7505 FBX µP 83C654
7500 VIDEO CONTROL TDA4790
7580 LTP TDA9177
SDA SCL I²C-S
2508 2509
TRANS MITTER 1403 AE1
I/O EXPANDER PCF8574A 7180 VGA-INTERFACE AF
DOLBY PART
DOLBY SAA7710T
ITT SOUND MSP34xx 7353
TDA9860 VDS SOUND 7600
O / P SOUND MODULE
2nd TUNER PIP
I/O EXPANDER PCF8574T 7860
TUNER UV1216 1775
PIP SDA9288 7788
S PIP MODULE
I/O EXP PCF8574 7050 FRAME ROT F2
I/O EXPANDER PCF8574AT IC9N
TUNER UV1216 E9F1
PIPO SAB9077 IC9A
VIDEO PROC TDA914X IC9J
AC VDS MODULE

CL 76532013_001 AI
240297

Supply voltages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SOUND 28V
SUR SOUND P 16
SOUND SUPPLY
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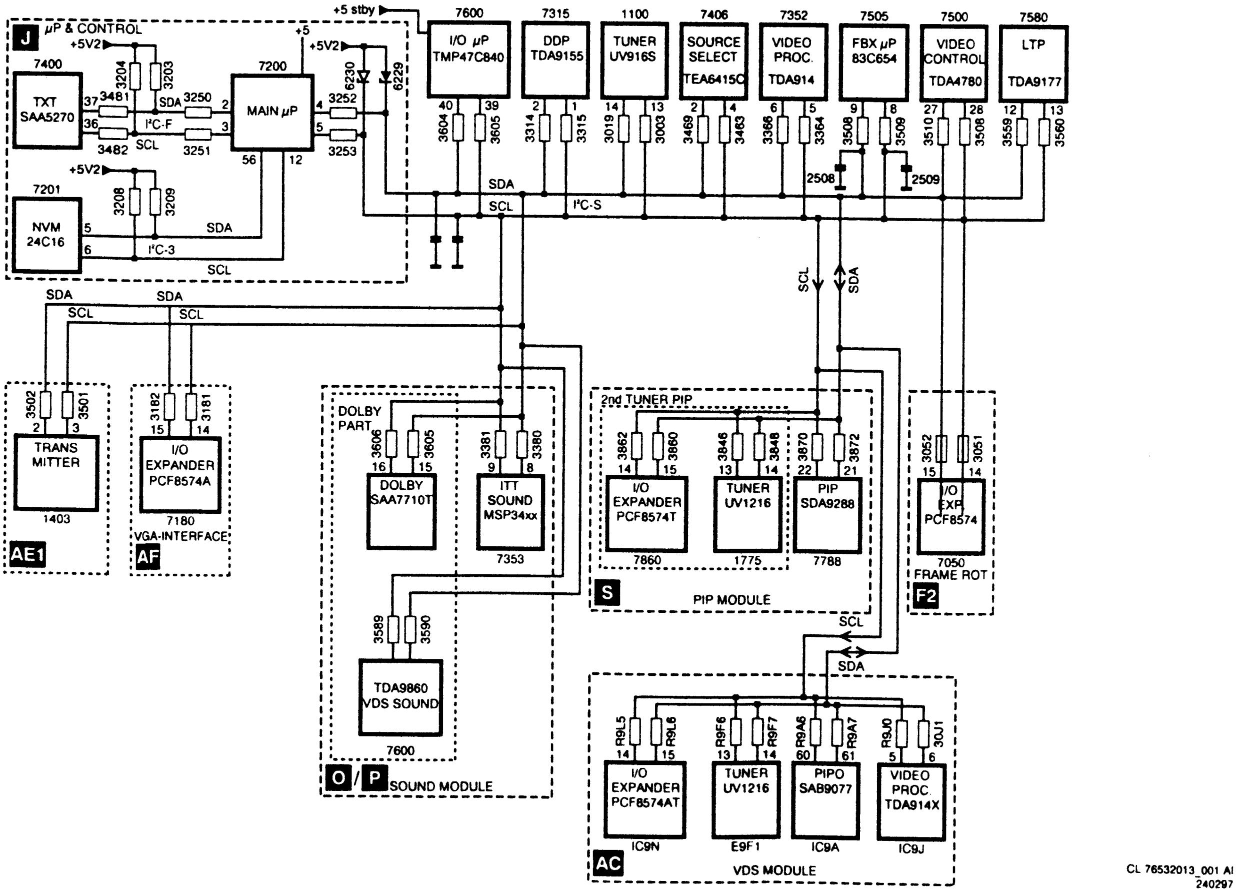
DBE PANEL P 19
+13A
+12V
CLICK FIT P 19
N/S PANEL P 18
DC SHIFT P 18
TUNER (U1775) P.35
TUNER (U1100) App.
VT
VOCONN
N/S PANEL P 18
+13VLOT
TDA 8177 (IC7600) App
Hpulse
+13D
CRT PANEL P 17
220V
VOD
VSCAVEM
CRT PANEL P 17
LOT 5430
+12V
TUNER (U1100)
AUDIO P.33 P.32
FEATURE BOX P.24 / P 29
SSP APPENDIX
FFS SUPPLY
STANDBY
-15VLOT
TDA 8177 (IC7600) App.
TDA9155 (IC5315) App.
+5 STANDBY
I/O PROC (IC7600)
Y+AG
KEYBOARD P 36 P 36
TOP CONTROLS W+X+AH+AI
SSP APPENDIX
AUDIO AMP AA
+16V -16V
AUDIO SUPPLYAB
STANDBY
+8S
DDP
+5D
TDA 9155 (IC7315)
+25V
+5V PANEL P. 16
+5V5
220V
TUNER (U1100)
COMBFILTER P.34
AUDIO P.32 P.33
IF P.23
TXT & CONTR P.20
P.36 P.35
TDA 4665 (IC7358)
FEATUREBOX P.24/P.29
VGA-INTER P.47
CVBS-IN P 37
8VP
TDA9141 (IC7352)
8V
TDA4780 (IC7500)
HEF4052 (IC7407)
8VTEA
TDA6415 (IC7406)
TDA8601 (IC7411)
TDA9177 (IC7580)
PAL PLUS P.31
AI P.30
AUDIO P.33 P.32
FRONT I/O P.37 P.47 P.49
PIP P.35 P.40
KEYBOARD P.36 P 36
FEATUREBOX P.24/P.29
TXT & CONTR P.20
YUV-INTER P.43
SSP APPENDIX

I^2C tree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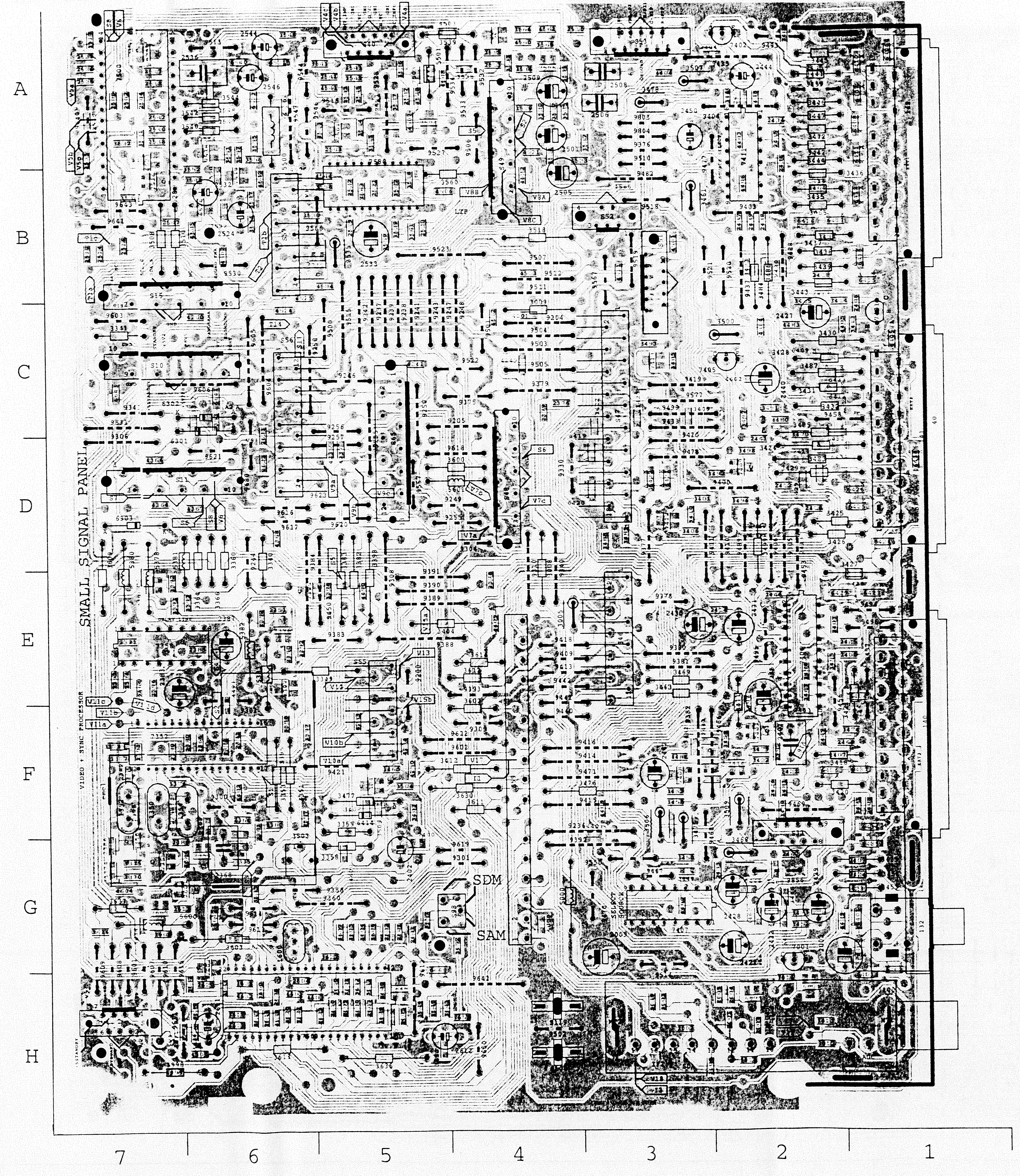
+5V2
7400
TXT SAA5270
3204 3203
3481 SDA 3250
I²C-F
3482 SCL 3251
7200
MAIN µP
+5 +5V2
6230 6229
3252
3253
56 12
7201
NVM 24C16
3208 3209
SDA
I²C-3
SCL
7600 I/O µP TMP47C840
7315 DDP TDA9155
1100 TUNER UV916S
7406 SOURCE SELECT TEA6415C
7352 VIDEO PROC. TDA914
7505 FBX µP 83C654
7500 VIDEO CONTROL TDA4780
7580 LTP TDA9177
3604 3605 3314 3315 3019 3003 3469 3463 3366 3364 3508 3509 3510 3508 3559 3560
2508 2509
SDA SCL I²C-S
SCL SDA
TRANS MITTER 1403 AE1
3502 3501
I/O EXPANDER PCF8574A 7180 VGA-INTERFACE AF
3182 3181
DOLBY PART
DOLBY SAA7710T
3606 3605
ITT SOUND MSP34xx 7353
3381 3380
TDA9860 VDS SOUND 7600
3589 3590
O / P SOUND MODULE
2nd TUNER PIP
I/O EXPANDER PCF8574T 7860
3862 3860
TUNER UV1216 1775
3846 3848
PIP SDA9288 7788
3870 3872
S PIP MODULE
I/O EXP PCF8574 7050 FRAME ROT F2
3052 3051
SCL SDA
I/O EXPANDER PCF8574AT IC9N
R9L5 R9L6
TUNER UV1216 E9F1
R9F6 R9F7
PIPO SAB9077 IC9A
R9A6 R9A7
VIDEO PROC. TDA914X IC9J
R9J0 30J1
AC VDS MODULE

CL 76532013_001 AI
240297

Small Signal Panel / Kleinsignalplatine / **MD 2.21/2.22/2.23** **13** Platine petits signaux



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7390	E	6	7503	A	4	9239	C	5	9310	E	4	9400	D	2	9453	E	2	9501	C	4	9530	B	6	9610	H	6	9856	G	2			
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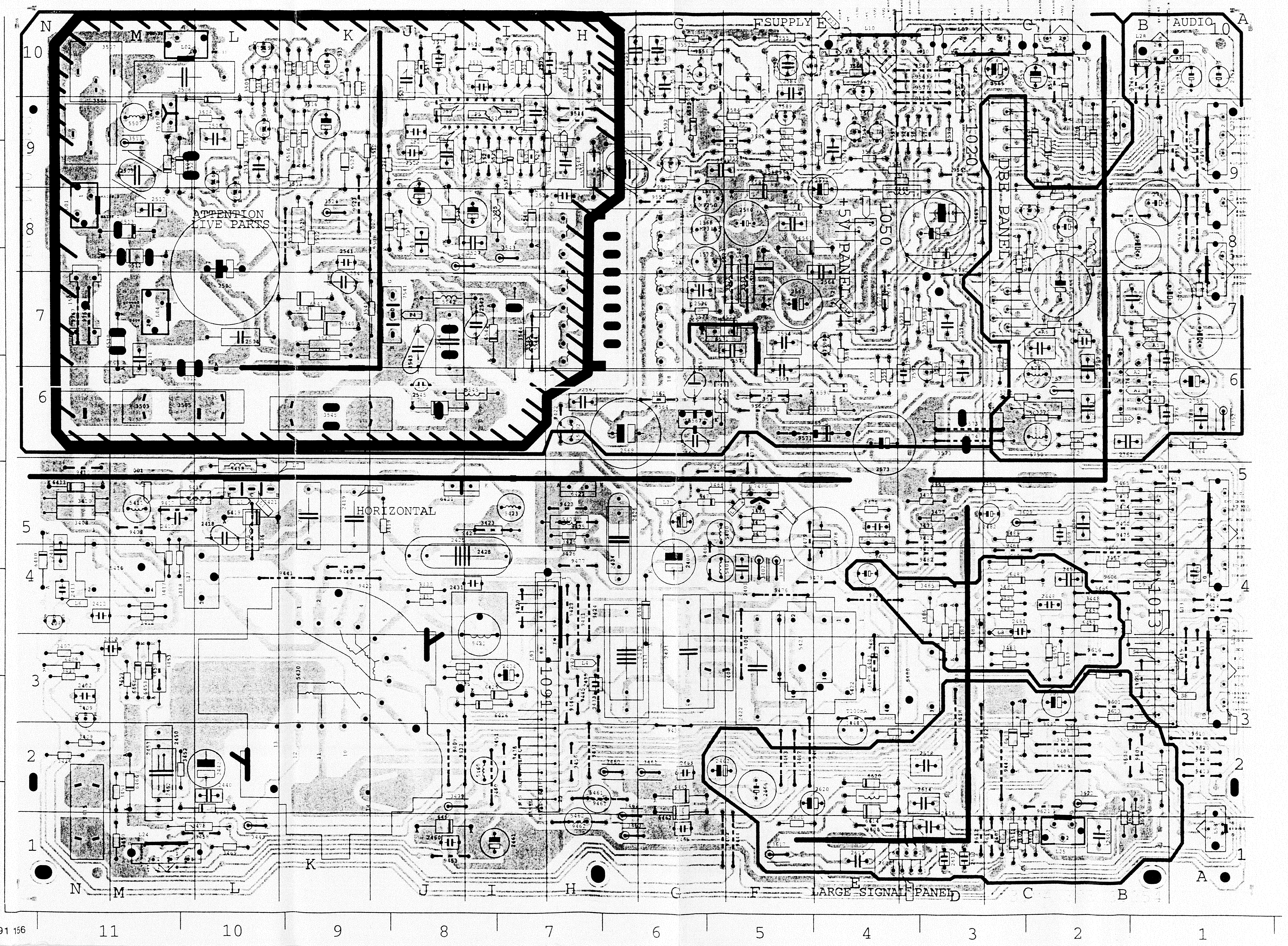
PCS 91 155

Large Signal Panel / Großsignalplatine / Platine forts signaux

See appendix for circuit diagram LSP & SSP & DDP

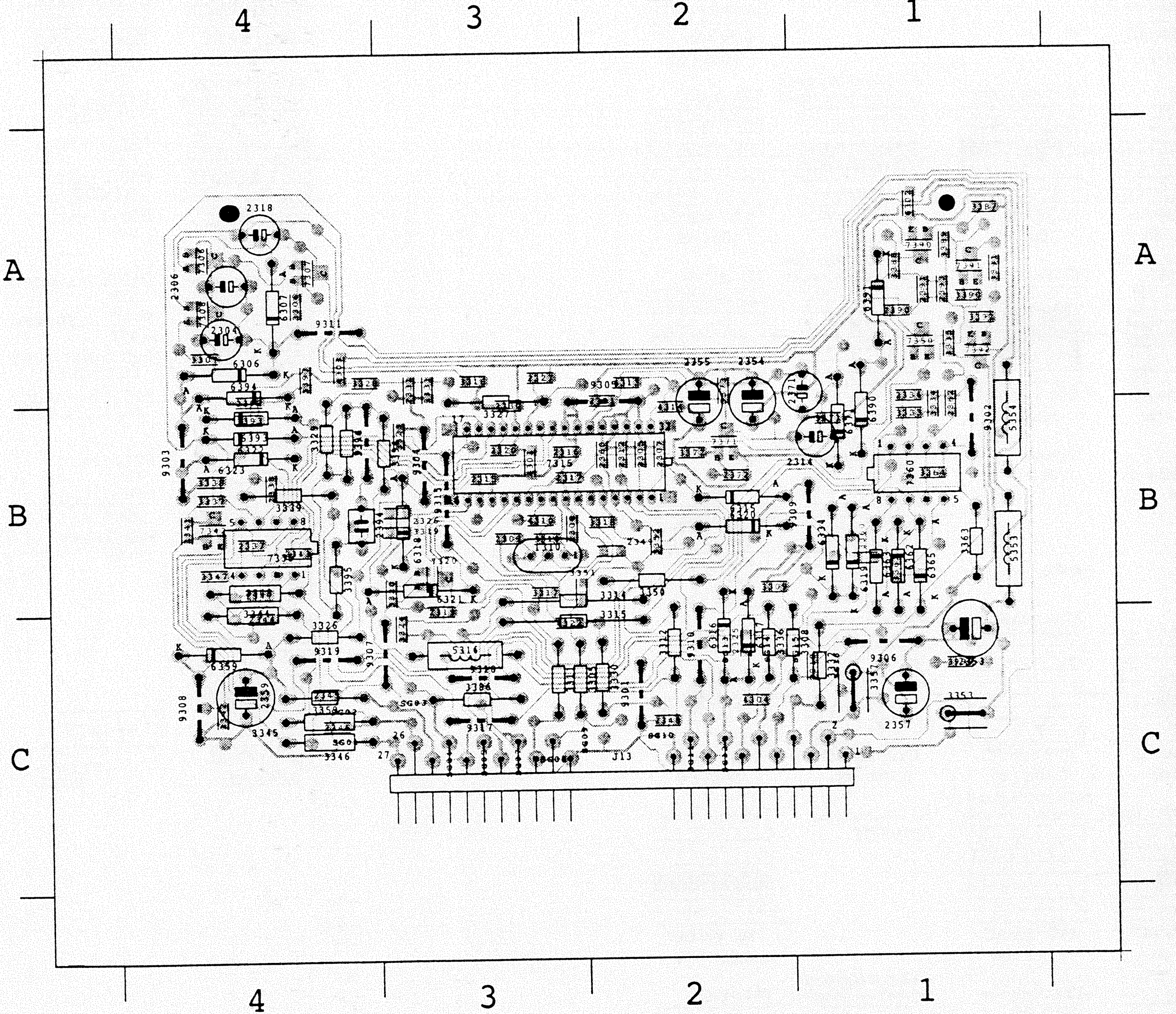

ATTENTION
LIVE PARTS
HORIZONTAL
SUPPLY
AUDIO
DBE PANEL
1020
1050
+5V PANEL
1013
1001
LARGE SIGNAL PANEL
A
B
C
D
E
F
G
H
N
M
L
K
J
I
1
2
3
4
5
6
7
8
9
10
11

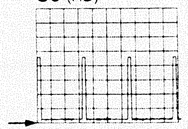
PCS 91 156

15A

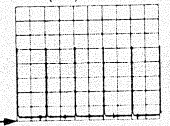
DDP (Geometry) panel / Digitalablenkprozessor-Platine (Geometrie) / Platine DDP (Géométrie)

1310 B 3	2317 B 3	2338 B 4	2359 C 4	3307 A 4	3320 B 3	3335 A 1	3350 B 2	3373 A 2	3397 A 4	5354 A 1	6334 B 1	7308 A 4	9302 A 1	9317 C 3
2304 A 4	2318 A 4	2343 B 4	2360 B 2	3308 B 2	3323 B 3	3336 B 2	3351 B 3	3386 C 3	3999 C 1	6306 A 4	6359 C 4	7315 B 2	9303 B 4	9318 C 3
2305 B 2	2319 B 3	2344 C 4	2362 B 1	3309 B 2	3324 C 3	3337 B 4	3352 B 2	3387 A 1	4301 B 3	6307 A 4	6362 C 1	7320 B 3	9304 B 3	9319 C 4
2306 A 4	2320 B 3	2345 C 4	2371 B 1	3310 B 3	3326 C 4	3338 B 4	3353 C 1	3388 A 1	4302 A 1	6315 B 2	6363 C 1	7335 B 4	9305 B 3	J13 C 1
2307 B 2	2321 A 2	2346 C 4	2372 B 2	3311 C 3	3327 A 3	3339 B 4	3357 C 1	3389 A 1	4303 A 4	6316 C 2	6365 B 1	7342 B 4	9306 C 1	
2308 B 3	2325 C 2	2347 B 4	2390 A 1	3312 C 2	3328 A 4	3341 B 4	3359 C 4	3390 A 1	4304 C 2	6317 B 2	6371 A 1	7350 A 1	9307 C 3	
2309 B 3	2326 B 3	2348 C 2	2391 A 1	3314 B 3	3329 A 4	3342 C 4	3360 B 1	3391 A 1	4310 B 3	6318 B 3	6390 A 1	7360 B 1	9308 C 4	
2310 C 1	2327 A 3	2349 B 2	2392 A 4	3315 C 3	3330 C 2	3343 B 4	3361 B 1	3392 A 1	4313 A 2	6319 B 1	6391 A 1	7371 B 2	9309 B 1	
2312 B 2	2330 B 3	2353 C 1	2393 A 1	3316 A 3	3331 A 3	3344 B 4	3363 B 1	3393 B 4	4314 B 2	6320 B 2	6393 B 4	7390 A 1	9310 C 2	
2314 B 1	2331 A 3	2354 B 2	2394 B 4	3317 B 3	3332 C 1	3345 C 4	3364 B 1	3394 B 3	4322 C 3	6321 B 4	6394 A 4	7391 A 1	9311 A 4	
2315 B 3	2334 A 1	2355 B 2	3305 C 3	3318 B 2	3333 B 1	3346 C 4	3371 B 1	3395 B 4	5316 C 3	6322 B 4	7306 A 4	7392 A 1	9314 B 4	
2316 B 3	2337 B 4	2357 C 1	3306 A 4	3319 B 3	3334 B 1	3347 B 4	3372 B 2	3396 B 4	5353 B 1	6323 B 4	7307 A 4	9301 C 2	9315 B 3	

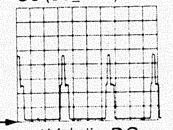



S6 (HD)

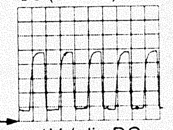
1V / div DC
10µs / div


S7 (VD)

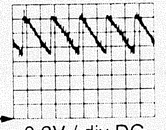
1V / div DC
5ms / div


S8 (SC_2FH)

1V / div DC
10µs / div


S9 (HDRIVE)

1V / div DC
5 µs / div


S10 (VDNEG)

0.2V / div DC
5ms / div

→ = 0V

OSC_B.AI
180396

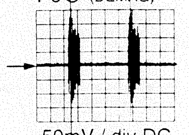
See appendix for circuit diagram LSP & SSP & DDP

002	K6	7480	D4	3523	I9	5567	F6	9427	I5	9618	D3	2596	D7
003	D3	7507	M9	3525	I9	5572	F7	9428	H3	9619	A4	2601	B1
004	B8	7520	I9	3526	I9	5573	D10	9429	H4	9620	A2	2609	C5
005	F7	7541	J7	3527	I9	5617	E2	9431	H2	9621	C2	2612	D1
1503	N7	7556	H10	3529	K8	5701	B8	9432	I2	9622	D2	2613	D1
2400	G4	7560	E9	3530	J10	6409	N3	9433	H3	9624	A4	2614	D2
2418	L5	7569	B9	3531	K9	6410	N4	9435	G2	9749	A9	2615	C3
2419	K5	7590	E7	3532	L10	6411	N5	9436	I2	9750	B6	2616	D1
2420	K5	7600	D1	3533	K10	6425	I3	9440	K4	9751	A8	2617	E1
2421	G3	7761	B6	3534	K10	6426	I3	9441	K4	9752	A8	2618	D2
2422	F3	L01	N8	3535	I10	6441	L2	9442	C2	9753	B10	2620	E2
2425	J4	L02	M10	3536	I10	6451	B4	9443	C3	9754	A9	2630	B5
2426	H5	L04	M7	3537	I10	6452	C3	9444	F1	9755	A8	2750	C8
2428	I4	L06	C10	3538	H10	6453	M3	9445	H3	9756	A8	2751	A10
2432	H3	L07	D10	3539	I10	6454	M3	9446	H3	9758	N7	2752	A10
2433	H3	L10	E10	3541	J7	6460	J1	9447	E3	9759	A9	2753	B6
2434	H5	L11	A5	3546	K7	6462	G2	9450	M3	9760	B8	2754	C7
2442	L2	L13	A4	3547	K7	6463	G2	9451	I2	9761	B10	2756	A6
2450	M2	L15	A3	3548	I9	6465	G4	9453	J1	9762	B8	2761	B6
2452	M2	L17	L4	3549	H9	6466	M2	9456	H2	9767	N7	2762	B7
2453	M2	L20	C8	3550	H9	6471	G5	9458	L1	9781	B6	2763	B7
2466	F2	L22	A9	3551	H9	6479	D4	9460	I2	9782	D8	2776	A6
2478	E5	L24	M1	3552	K10	6480	C4	9461	H2	9786	B10	2778	A7
2505	L8	L25	C1	3553	F9	6481	C4	9462	H1	1440	E2	2787	B7
2506	M10	L28	B10	3554	E9	6482	D4	9463	F2	1566	G8	2788	A6
2509	M9	L38	A8	3555	F10	6483	E3	9465	B4	1572	G8	3401	F4
2540	K7	L39	A8	3556	G10	6506	M9	9466	C4	1580	G8	3402	F4
2542	I7	L50	E8	3557	G10	6507	J8	9470	G5	2401	F4	3443	L1
2543	J7	L58	A1	3558	G10	6508	M9	9471	F6	2402	N3	3460	H2
2544	J7	L91	H3	3560	F9	6509	L9	9472	B5	2409	A4	3461	G2
2550	H9	L93	H4	3561	F9	6510	M7	9473	B5	2410	M3	3462	H1
2561	D8	2504	L7	3562	G6	6511	M6	9475	B5	2411	N4	3463	H1
2563	F7	2531	J10	3563	E9	6512	M8	9476	F4	2412	N4	3479	J2
2566	D8	3407	N3	3564	C7	6513	M8	9477	H4	2413	N4	3502	I8
2567	G6	3409	N2	3565	E9	6514	L9	9478	E4	2417	M5	3513	M9
2568	G6	3411	M4	3566	E9	6515	K9	9479	E5	2424	I3	3524	K8
2569	H6	3412	M4	3568	E10	6516	K9	9481	E3	2431	I4	3543	I8
2573	E6	3413	N3	3569	E9	6518	I9	9482	D4	2435	H3	3559	F10
2580	F8	3414	B4	3570	G7	6524	K9	9508	J8	2440	L2	3609	C5
2755	C7	3416	N2	3571	D9	6525	J8	9509	F10	2448	C4	3617	F1
2765	A7	3417	M4	3572	F9	6540	K7	9510	D9	2457	C4	3622	B2
2766	B8	3418	M4	3579	J10	6541	K7	9520	I10	2460	J1	3752	A6
2767	A7	3419	J5	3582	D9	6542	I7	9522	K8	2461	I1	3753	C6
2768	B8	3425	H5	3583	D7	6545	J6	9523	K8	2462	F2	7408	N4
3400	G3	3426	H4	3584	F9	6548	I8	9525	I9	2463	G2	7409	N3
3408	N5	3430	J4	3585	F9	6550	G10	9526	I9	2465	G1	7512	L8
3410	N5	3431	J4	3586	F9	6560	F8	9530	J10	2467	E5	7513	L9
3415	N1	3434	I3	3587	F9	6561	F8	9536	H9	2468	G5	7514	L9
3423	I5	3435	I3	3588	E9	6563	D8	9537	H10	2480	E4	7515	L10
3453	M3	3448	B4	3589	E7	6564	A6	9543	F7	2481	C4	7555	G10
3478	L1	3449	C3	3592	G9	6566	K7	9544	H9	2482	C5	7561	E9
3503	M6	3450	M1	3593	E6	6569	C10	9545	I7	2503	J8	7562	E10
3505	M6	3451	M2	3594	D7	6576	D8	9551	G8	2507	J8	7588	E10
3506	N9	3452	M2	3595	D7	6577	E7	9552	H9	2508	L9	7589	F9
3507	N10	3457	B4	3596	D9	6581	F8	9557	F6	2511	M7	7591	G9
3528	M9	3458	C4	3597	G9	6590	E6	9560	D10	2512	M8	7592	D6
3544	I7	3459	M3	3598	F9	6591	D7	9561	F6	2513	L9	7770	C8
3545	K6	3465	B5	3599	E6	6592	G9	9562	E7	2514	K9		
3567	F6	3466	C5	3601	C1	6614	E2	9563	D10	2521	J9		
3573	D6	3467	D5	3602	C1	6617	C2	9564	G6	2522	J9		
3574	D6	3468	G5	3603	C1	6618	C2	9565	D9	2524	I9		
3575	C6	3469	L1	3610	C2	6620	E2	9569	C10	2525	I8		
3590	E6	3470	F5	3611	C1	6753	B9	9571	F6	2526	H8		
5400	G5	3471	F5	3612	B2	6754	C9	9572	F7	2527	I8		
5401	G4	3472	D5	3613	B3	6755	C8	9573	D6	2528	J9		
5402	H6	3473	D5	3614	B3	6756	C9	9574	D6	2533	K10		
5410	M4	3474	B5	3618	B1	6757	B9	9575	D10	2534	J10		
5411	M5	3475	E5	3619	B1	6770	C9	9576	D9	2535	I10		
5421	I4	3476	F5	3620	F1	9400	F3	9577	D10	2538	H10		
5422	E3	3477	D5	3750	C6	9401	G4	9578	D9	2541	K8		
5423	I5	3480	C4	3751	C6	9402	F1	9579	E7	2545	J6		
5424	F3	3481	C4	3755	A7	9403	C2	9581	J9	2548	H9		
5430	K3	3482	E2	3760	B6	9405	F2	9585	F9	2554	G10		
5460	I2	3483	C3	3761	B6	9406	C2	9592	G8	2555	G10		
5461	H2	3484	C3	3762	B7	9407	F2	9597	D9	2557	G10		
5462	H1	3485	D4	3763	C7	9408	M5	9600	E1	2559	C10		
5480	D3	3486	D4	3764	B7	9409	J2	9601	B3	2560	F8		
5507	M9	3487	B4	3765	C8	9410	N5	9602	B3	2562	H6		
5550	H7	3488	C5	3766	B9	9411	H4	9603	A5	2564	E8		
5750	C6	3489	E3	3770	C8	9412	D5	9604	B2	2565	C10		
5751	C6	3508	L9	3771	C8	9413	A2	9605	B2	2570	G7		
6419	L5	3509	L10	3772	C8	9414	A2	9606	B4	2571	E9		
6421	I5	3510	J8	5418	L5	9415	D4	9607	B4	2572	F7		
6422	H5	3512	K9	5419	L5	9417	M5	9608	B5	2574	E9		
6562	F8	3514	L10	5425	H5	9419	L5	9609	C2	2575	D6		
6567	G6	3515	K10	5426	L5	9420	I4	9610	A2	2581	F9		
6571	F7	3516	K10	5525	I8	9421	K4	9611	E4	2584	F10		
6572	F7	3517	L9	5542	J7	9422	H6	9612	D1	2590	F10		
6573	E6	3518	I9	5543	F7	9423	H5	9613	C1	2591	F10		
7421	L5	3519	K10	5544	I7	9424	H4	9615	A3	2592	D6		
7470	F5	3521	J9	5545	I6	9425	H5	9616	B3	2593	F6		
7475	E4	3522	K8	5561	D8	9426	L5	9617	A3	2594	F7		

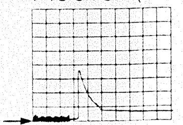
POWER SUPPLY

P1 ⏼ (VOS)
140V DC

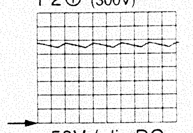
P1 ⏻ (VOS)
0V DC


P6 ⏻ (DEMAG)

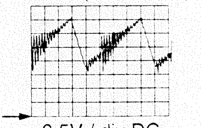
50mV / div DC
0.1s / div


P13 ON-OFF (PORT)

1V / div DC
1s / div


P2 ⏼ (300V)

50V / div DC
5ms / div

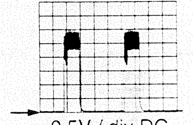

P7 ⏼ (OSCILLATOR)

0.5V / div DC
5µs / div

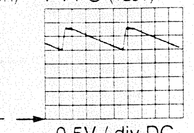
P14 ⏼ (+25V)
27V5 DC

P2 ⏻
300V DC

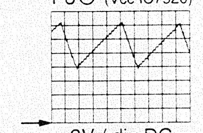
P3 ⏼ (Vcc IC7520)
14V DC


P7 ⏻ (OSCILLATOR)

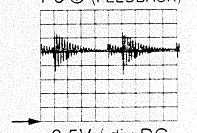
0.5V / div DC
0.1s / div


P14 ⏻ (+25V)

0.5V / div DC
20ms / div

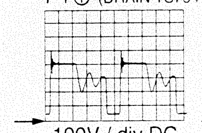

P3 ⏻ (Vcc IC7520)

2V / div DC
20ms / div

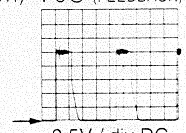

P8 ⏼ (FEEDBACK)

0.5V / div DC
5µs / div

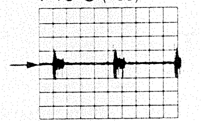
P15 ⏼ (+5S)
25V DC


P4 ⏼ (DRAIN TS7541)

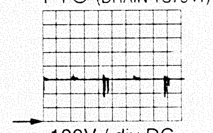
100V / div DC
5µs / div


P8 ⏻ (FEEDBACK)

0.5V / div DC
20ms / div


P15 ⏻ (+5S)

20mV / div DC
20ms / div


P4 ⏻ (DRAIN TS7541)

100V / div DC
0.1s / div

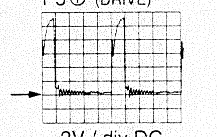
P9 ⏼ (+5V STANDBY)
4V9 DC

P9 ⏻ (+5V STANDBY)
4V9 DC

P10 ⏼ (+8S)
8V6 DC

P10 ⏻ (+8S)
0V DC

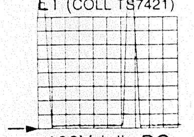
HORIZONTAL (LINE)


P5 ⏼ (DRIVE)

2V / div DC
5µs / div

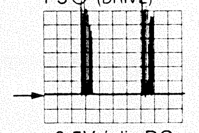
P11 ⏼ (STANDBY)
3V9 DC

P11 ⏻ (STANDBY)
0V1 DC


L1 (COLL TS7421)

100V / div DC
5µs / div

P12 ⏼ (SOUND-SUP.)
29V5 DC

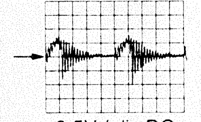

P5 ⏻ (DRIVE)

0.5V / div DC
0.1s / div

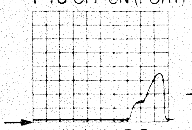
P12 ⏻ (SOUND-SUP.)
3V DC

L2
(TS7470 series switch)
140V9 DC

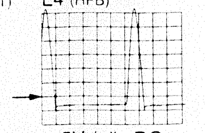
L3
(TS7470 series switch)
140V4 DC


P6 ⏼ (DEMAG)

0.5V / div DC
5µs / div

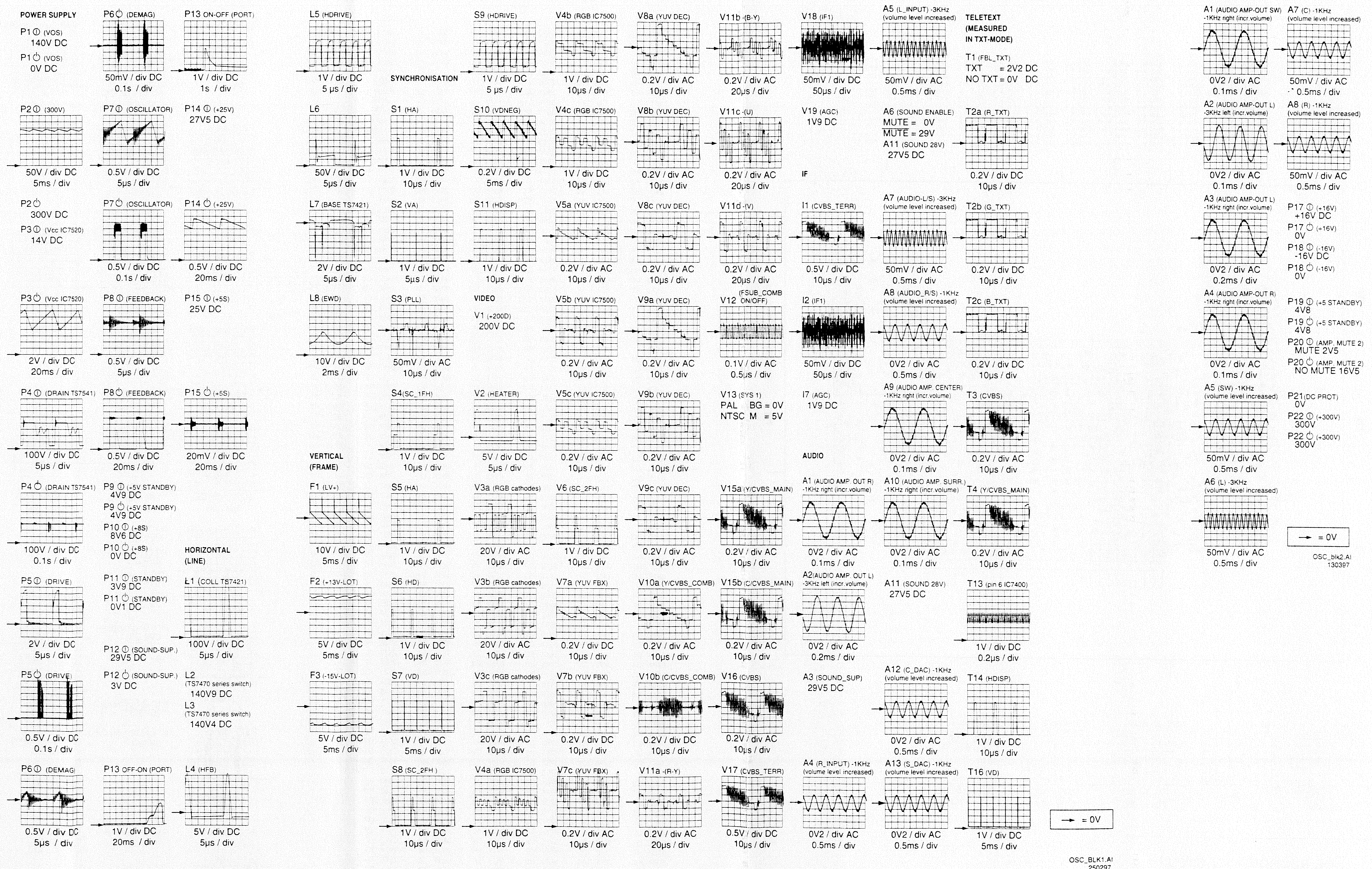

P13 OFF-ON (PORT)

1V / div DC
20ms / div


L4 (HFB)

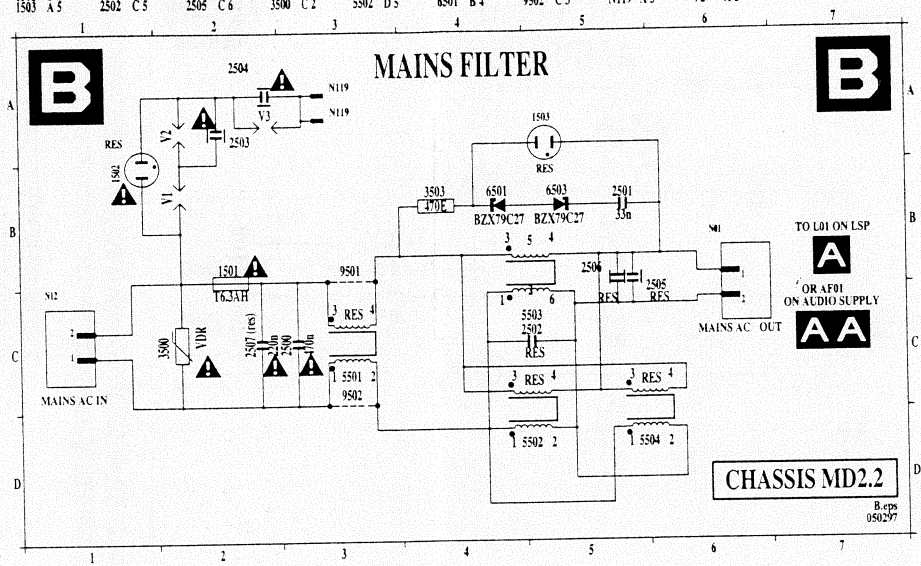
5V / div DC
5µs / div

Overview oscillograms / Übersicht der Oszillogramme / Vue d'ensemble des oscillogrammes

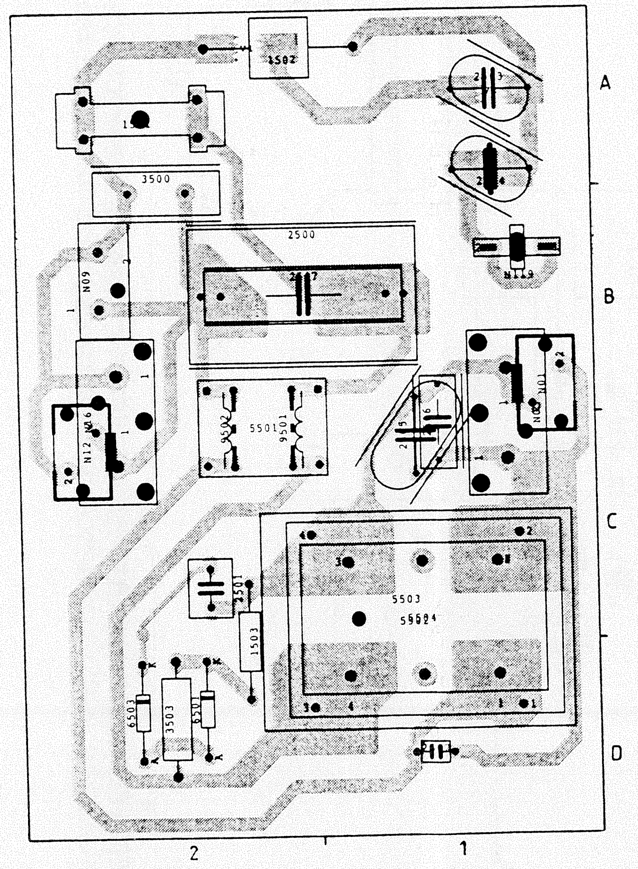


Mains filter panel / Netzfilterplatine / Platine filtre d'alimentation

1501	B 2
1502	B 1
1503	A 5
2500	C 3
2501	B 5
2502	C 5
2503	A 2
2504	A 2
2505	C 6
2506	B 5
2507	C 2
3500	C 2
3503	B 4
5501	C 3
5502	D 5
5503	C 5
5504	D 6
6501	B 4
6503	B 5
9501	B 3
9502	C 3
N01	B 6
N119	A 3
N119	A 3
N12	C 1
V1	B 2
V2	A 2
V3	A 2

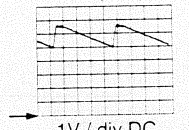

B
MAINS FILTER
B
2504
N119
N119
V3
V2
2503
RES
1502
V1
1503
RES
3503
470E
6501
BZX79C27
6503
BZX79C27
2501
33n
TO L01 ON LSP
A
OR AF01
ON AUDIO SUPPLY
AA
N01
MAINS AC OUT
1501
T63AH
9501
2506
2505
RES
RES
5503
2502
RES
N12
3500
VDR
2507 (res)
2500
MAINS AC IN
5501
9502
RES
RES
5502
5504
CHASSIS MD2.2
B.eps
050297

1501	A 2
1502	A 1
1503	C 2
2500	B 2
2501	C 2
2502	D 1
2503	A 1
2504	A 1
2505	C 1
2506	C 1
2507	B 2
3500	B 2
3503	D 2
5501	B 2
5502	D 1
5503	D 1
5504	D 1
6501	D 2
6503	D 2
9501	B 2
9502	B 2
N01	B 1
N03	C 1
N09	B 2
N12	C 2
N16	B 2
N119	B 1


1502
3500
2500
N09
N12
5501
9501
N01
5503
5504
1503
6501
3503
3520
A
B
C
D
2
1

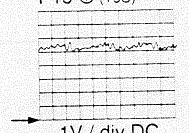
P14 ① (+25V)
27V5 DC

P14 ⏻ (+25V)



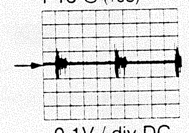
1V / div DC
0.1s / div

P15 ① (+5S)



1V / div DC
10µs / div

P15 ⏻ (+5S)

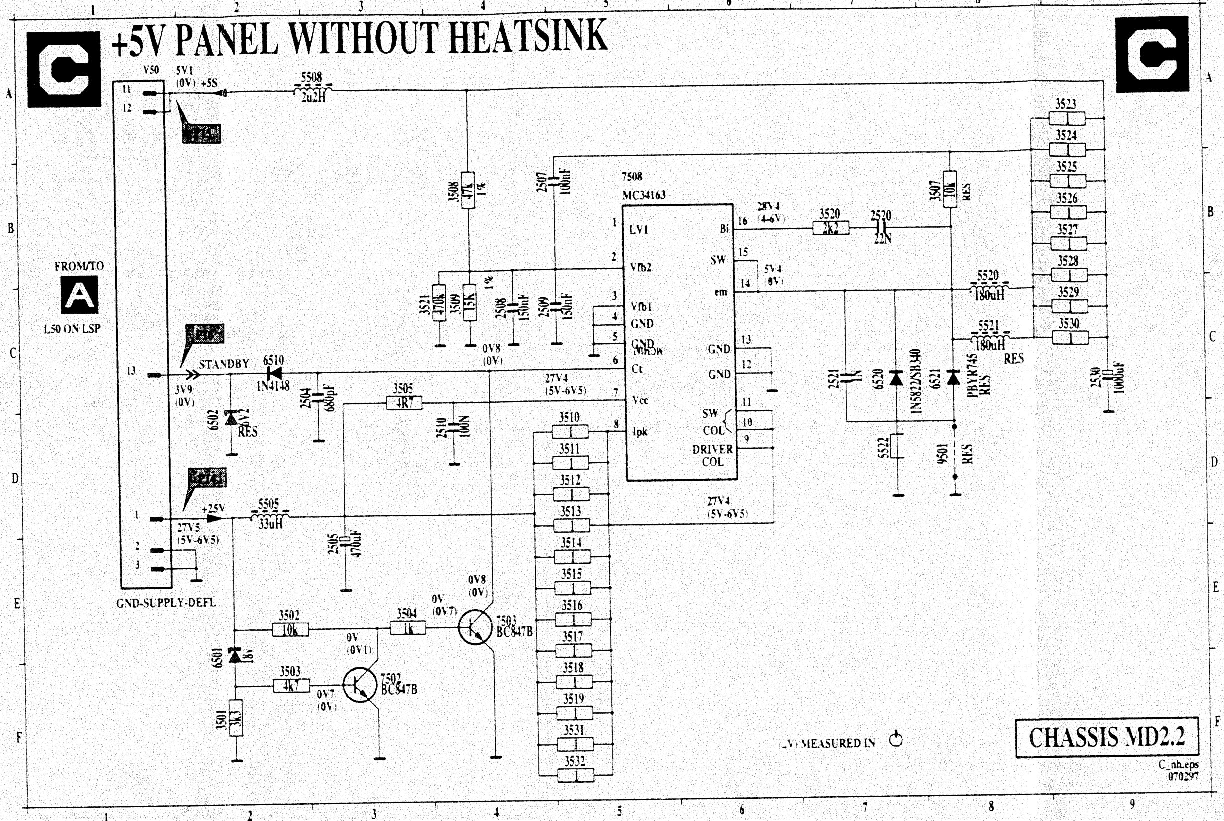


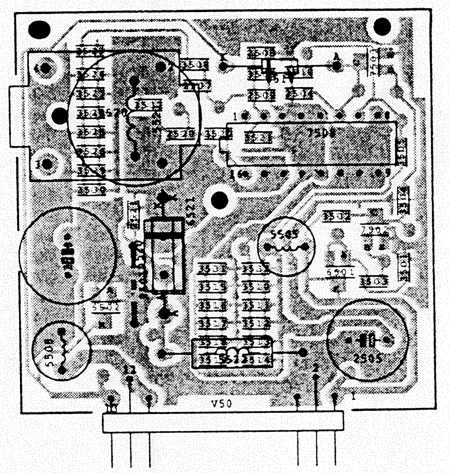
0.1V / div DC
0.1s / div

→ = 0V

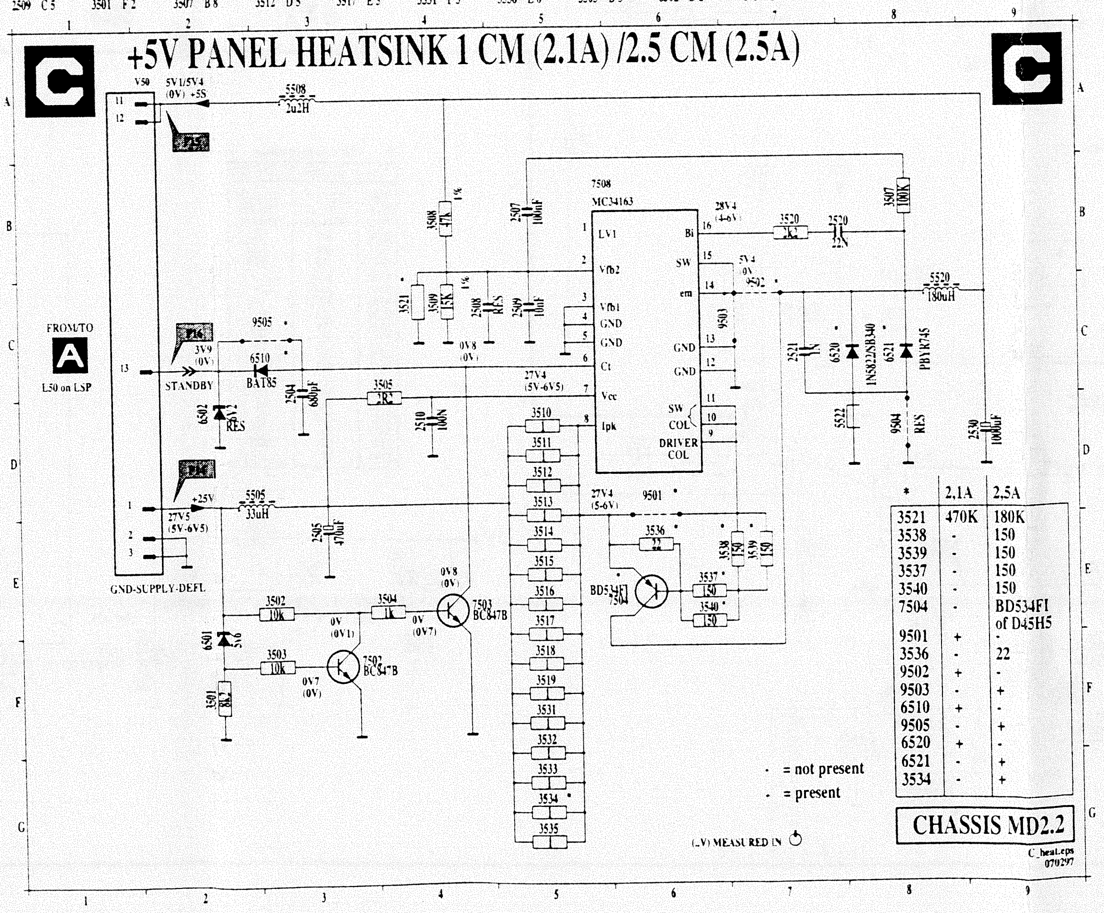
OSC_C.AI
110397

2504	C 3
2505	E 3
2507	B 4
2508	C 4
2509	C 4
2510	D 4
2520	B 7
2521	C 7
2530	C 9
3501	F 2
3502	E 2
3503	F 2
3504	E 3
3505	C 3
3507	B 8
3508	B 4
3509	C 4
3510	D 5
3511	D 5
3512	D 5
3513	D 5
3514	E 5
3515	E 5
3516	E 5
3517	E 5
3518	F 5
3519	F 5
3520	B 7
3521	C 4
3523	A 9
3524	A 9
3525	B 9
3526	B 9
3527	B 9
3528	B 9
3529	C 9
3530	C 9
3531	F 5
3532	F 5
5505	D 2
5508	A 3
5520	C 8
5521	C 8
5522	D 7
6501	E 2
6502	D 2
6510	C 2
6520	C 7
6521	C 8
7502	F 3
7503	E 4
7508	B 5
9501	D 8
V50	A 1


C
+5V PANEL WITHOUT HEATSINK
C
V50
5V1
(0V) +5S
5508
2u2H
FROM/TO
A
L50 ON LSP
7508
MC34163
LV1
Vfb2
Vfb1
GND
Ct
Vcc
Ipk
Bi
SW
em
GND
GND
SW COL
DRIVER COL
STANDBY
6510
1N4148
3V9 (0V)
6502
RES
2504
680pF
3505
4R7
+25V
5505
33uH
27V5 (5V-6V5)
GND-SUPPLY-DEFL
3502
10k
3504
1k
7503
BC847B
3503
4k7
7502
BC847B
6501
3501
3520
2520
22N
5520
180uH
5521
180uH
6520
1N5822/SB340
6521
PBYR745
9501
RES
2530
1000uF
3523
3524
3525
3526
3527
3528
3529
3530
3510
3511
3512
3513
3514
3515
3516
3517
3518
3519
3531
3532
(...V) MEASURED IN
CHASSIS MD2.2
C_nh.eps
070297


5505
5508
2505
V50

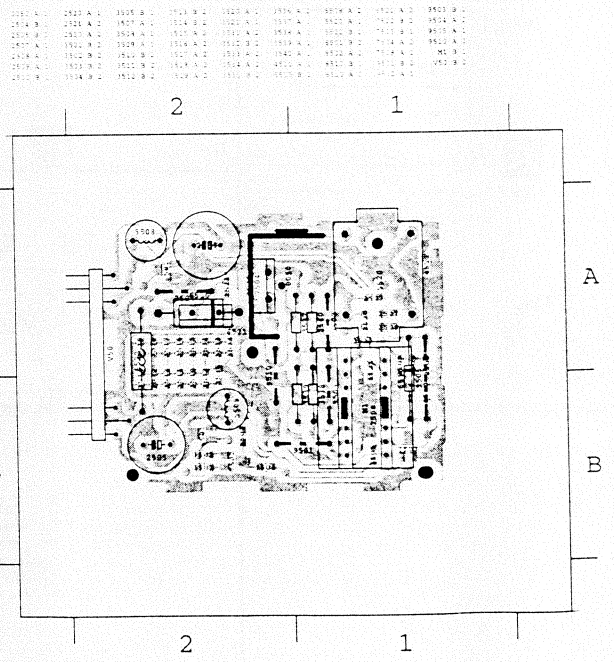
2504	C 3
2505	E 3
2507	B 5
2508	C 4
2509	C 5
2510	D 4
2520	B 8
2521	C 7
2530	D 9
3501	F 2
3502	E 3
3503	F 3
3504	E 4
3505	C 4
3507	B 8
3508	B 4
3509	C 4
3510	D 5
3511	D 5
3512	D 5
3513	D 5
3514	E 5
3515	E 5
3516	E 5
3517	E 5
3518	F 5
3519	F 5
3520	B 7
3521	C 4
3531	F 5
3532	F 5
3533	G 5
3534	G 5
3535	G 5
3536	E 6
3537	E 6
3538	E 7
3539	E 7
3540	E 6
5505	D 3
5508	A 3
5520	C 8
5522	D 8
6501	E 2
6502	D 2
6510	C 3
6520	C 7
6521	C 8
7502	F 3
7503	E 4
7504	E 6
7508	B 5
9501	D 6
9502	C 7
9503	C 7
9504	D 8
9505	C 3
V50	A 2

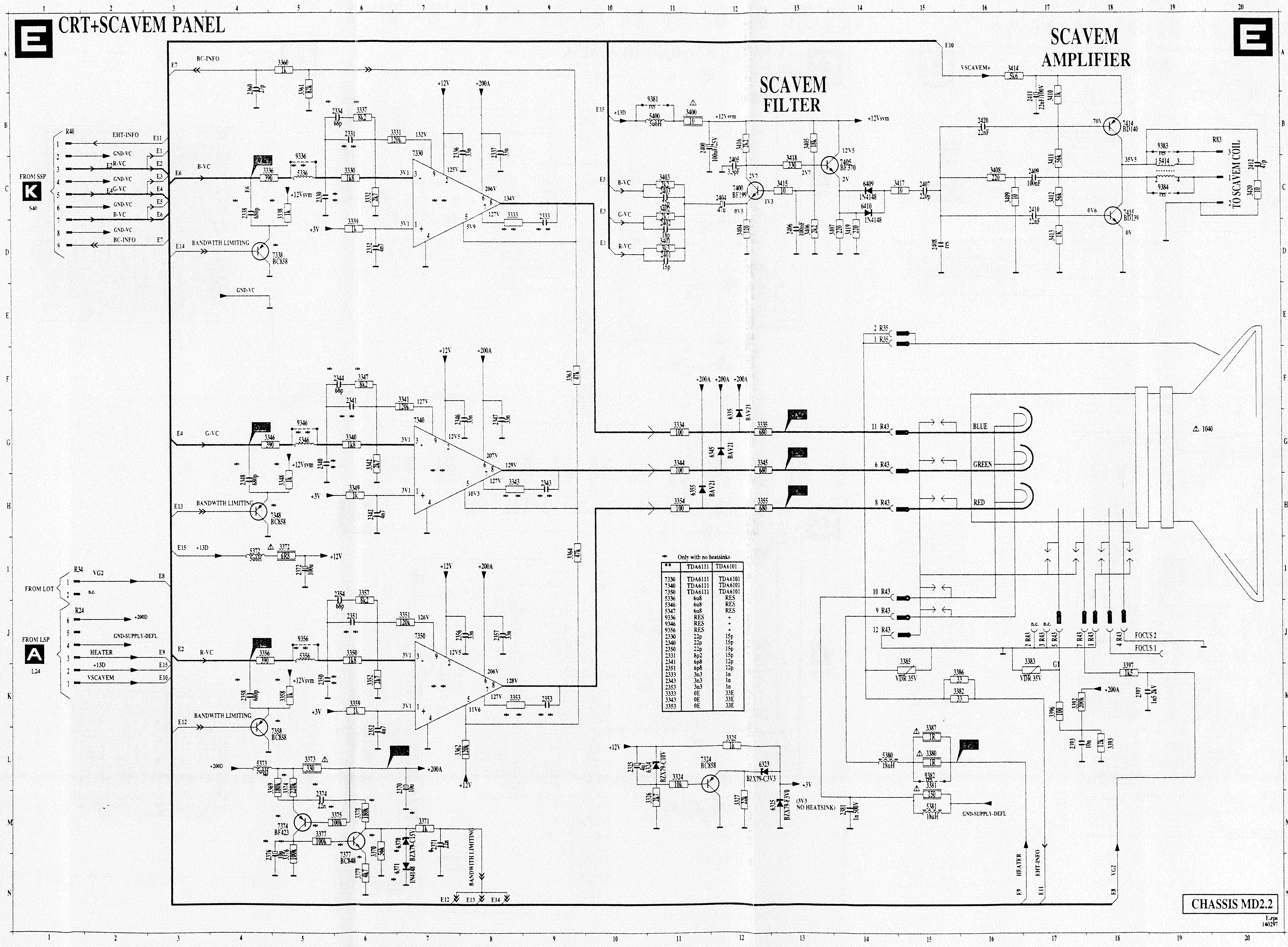

C
+5V PANEL HEATSINK 1 CM (2.1A) /2.5 CM (2.5A)
C
V50
5V1/5V4
(0V) +5S
5508
2u2H
FROM/TO
A
L50 on LSP
7508
MC34163
9505
STANDBY
6510
BAT85
3505
5505
33uH
GND-SUPPLY-DEFL
3536
BD534FI
7504
9501
7503
BC847B
7502
BC847B
5520
180uH
6520
1N5822/SB340
6521
PBYR745
9504
RES
2530
1000uF
(...V) MEASURED IN
C_heat.eps
070297

*	2,1A	2,5A
3521	470K	180K
3538	-	150
3539	-	150
3537	-	150
3540	-	150
7504	-	BD534FI of D45H5
9501	+	-
3536	-	22
9502	+	-
9503	-	+
6510	+	-
9505	-	+
6520	+	-
6521	-	+
3534	-	+

- = not present
+ = present

CHASSIS MD2.2


2
1
A
A
B
B
2505
2
1


E
CRT+SCAVEM PANEL
SCAVEM FILTER
SCAVEM AMPLIFIER
FROM SSP
K
S40
FROM LOT
FROM LSP
A
L24
EHT-INFO
GND-VC
R-VC
G-VC
B-VC
BC-INFO
VG2
HEATER
+13D
VSCAVEM
GND-SUPPLY-DEFL
BANDWITH LIMITING
+12V
+200A
+200D
+12Vsvm
VSCAVEM+
TO SCAVEM COIL
BLUE
GREEN
RED
FOCUS 2
FOCUS 1
1040
TDA6111
BC858
BF423
BC848
BF199
BF370
BD140
BD139
1N4148
BAV21
BZX79-C10V
BZX79-C3V3
BZX79-F3V0
(3V3 NO HEATSINK)
VDR 35V
CHASSIS MD2.2
E.eps
140297

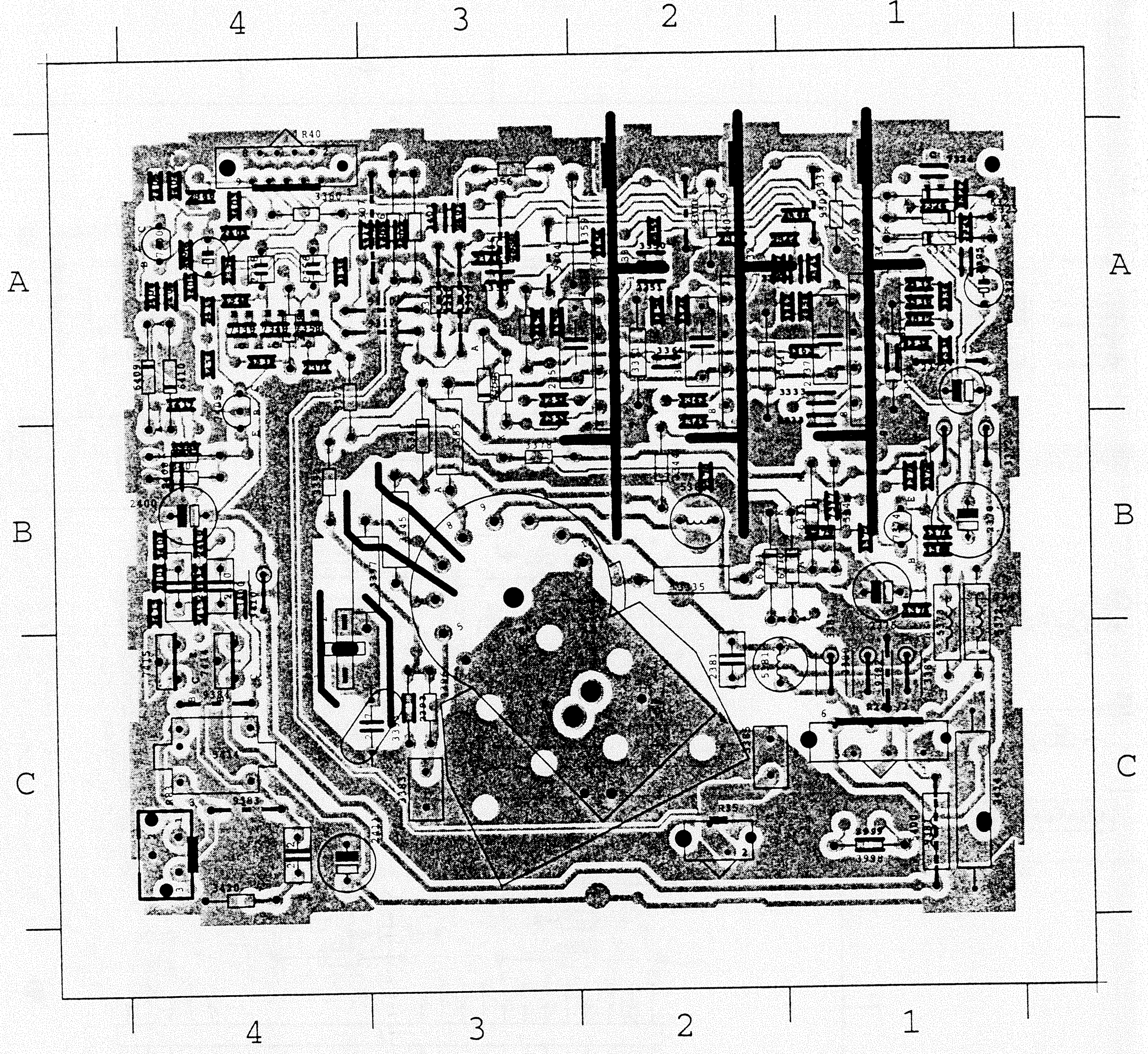
* Only with no heatsinks

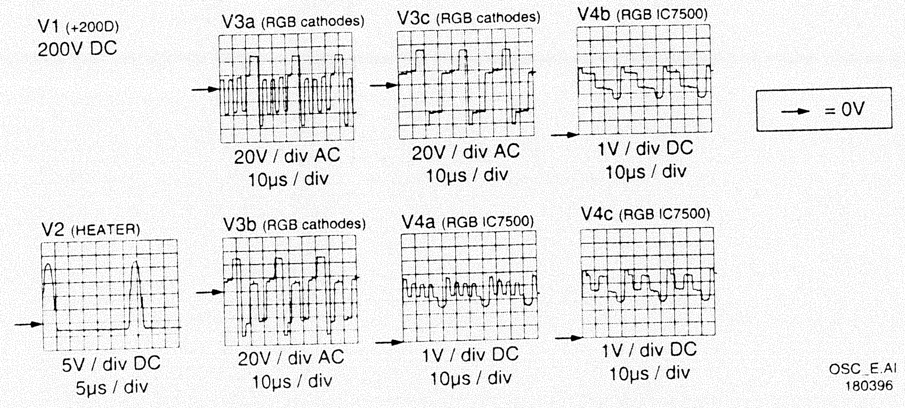
**	TDA6111	TDA6101
7330	TDA6111	TDA6101
7340	TDA6111	TDA6101
7350	TDA6111	TDA6101
5336	6u8	RES
5346	6u8	RES
5347	6u8	RES
9336	RES	+
9346	RES	+
9356	RES	+
2330	22p	15p
2340	22p	15p
2350	22p	15p
2331	8p2	15p
2341	6p8	12p
2351	6p8	12p
2333	3n3	1n
2343	3n3	1n
2353	3n3	1n
3333	0E	33E
3343	0E	33E
3353	0E	33E

2325	L10
2330	C 5
2331	B 6
2332	D 6
2333	C 9
2334	B 6
2336	B 8
2337	B 8
2338	C 4
2340	G 5
2341	F 6
2342	H 6
2343	H 9
2344	F 6
2346	G 8
2347	G 8
2348	H 4
2350	K 5
2351	J 6
2352	L 6
2353	K 9
2354	I 6
2356	J 8
2357	J 8
2358	K 4
2360	A 4
2370	L 7
2371	M 7
2372	I 5
2374	M 5
2376	M 4
2381	M14
2393	L17
2397	K18
2400	B11
2401	D11
2402	D11
2403	C11
2404	C12
2405	C12
2406	D13
2407	C15
2408	D15
2409	C17
2410	C17
2411	B17
2412	C20
2420	B16
3324	L11
3325	L12
3326	M11
3327	M12
3330	C 6
3331	B 7
3332	C 6
3333	C 8
3334	G11
3335	G12
3336	C 5
3337	B 6
3338	C 5
3339	D 6
3340	G 6
3341	F 7
3342	G 6
3343	H 8
3344	G11
3345	G12
3346	G 5
3347	F 6
3348	H 5
3349	H 6
3350	J 6
3351	J 7
3352	K 6
3353	K 8
3354	H11
3355	H12
3356	J 4
3357	I 6
3358	K 5
3359	K 6
3360	A 5
3361	A 5
3362	L 8
3363	F 9
3364	I 9
3369	L 5
3370	M 6
3371	M 7
3372	I 5
3373	L 5
3374	L 5
3375	M 6
3376	M 5
3377	M 5
3378	M 6
3379	N 6
3380	L15
3381	L15
3382	K16
3383	J17
3385	J15
3386	K16
3387	L15
3392	K17
3393	L18
3396	K17
3397	K18
3400	B11
3401	D11
3402	C11
3403	C11
3404	D12
3405	B13
3406	D13
3407	D14
3408	C16
3409	C16
3410	B17
3411	C17
3412	C17
3413	D17
3414	A16
3415	C13
3416	B12
3417	C15
3418	C13
3419	D14
3420	C20
5336	C 5
5346	G 5
5356	J 5
5372	I 4
5373	L 4
5380	L14
5381	M15
5400	B11
5414	C19
6323	L12
6324	L11
6325	M13
6335	G12
6345	G12
6355	H11
6370	M 7
6371	N 7
6409	C14
6410	C14
7324	L11
7330	B 7
7338	D 5
7340	G 7
7348	H 4
7350	J 7
7358	L 4
7374	M 5
7377	N 6
7400	C12
7405	C14
7414	B18
7415	C18
9336	C 5
9346	G 5
9356	J 5
9381	B11
9382	L15
9383	B19
9384	C19
R24	J 2
R34	I 1
R35	E14
R35	E14
R40	B 1
R43	J18
R43	J17
R43	J17
R43	J18
R43	J17
R43	G14
R43	J17
R43	H14
R43	J14
R43	I14
R43	G14
R43	J14
R83	B20

17A

31 A 1	2341 A 1	2357 A 2	2402 A 3	3325 A 1	3340 A 1	3353 A 3	3370 B 2	3383 C 3	3405 A 4	3418 A 4	5400 C 1	7330 A 1	9301 A 1	R24 C 1
32 A 2	2342 A 2	2358 A 4	2403 A 4	3326 A 1	3341 A 2	3354 B 3	3371 B 4	3385 C 2	3406 A 4	3419 B 4	5414 C 4	7338 A 4	9303 A 1	R34 C 4
33 A 2	2343 B 2	2360 A 4	2404 A 4	3327 A 1	3342 A 1	3355 A 3	3372 B 1	3386 A 3	3407 B 4	3420 C 4	6323 A 1	7340 A 2	9304 A 3	R35 C 2
2325 A 1	2344 A 1	2370 B 1	2405 A 4	3330 A 1	3343 A 2	3356 A 3	3373 B 1	3387 C 1	3408 B 4	3998 C 1	6324 A 1	7348 A 4	9307 A 3	R40 A 4
2330 A 3	2346 A 2	2371 A 4	2406 A 4	3331 A 1	3344 B 2	3357 A 2	3374 B 1	3392 B 4	3409 B 4	3999 C 1	6325 A 1	7350 A 2	9310 A 3	R43 B 3
2331 A 1	2347 A 2	2372 A 1	2407 B 4	3332 A 1	3345 B 3	3358 A 4	3375 B 1	3393 C 3	3410 B 4	4390 A 1	6335 B 1	7358 A 4	9311 A 3	R83 C 4
2332 A 1	2348 A 4	2374 B 1	2408 B 4	3333 A 1	3346 A 3	3359 A 2	3376 B 1	3396 C 3	3411 B 4	5336 A 3	6345 B 3	7374 B 1	9336 A 3	
2333 B 1	2350 A 3	2376 B 1	2409 B 4	3334 B 1	3347 A 2	3360 A 4	3377 B 1	3397 B 3	3412 B 4	5346 A 3	6355 A 3	7377 B 1	9346 A 3	
2334 A 1	2351 A 2	2381 C 2	2410 B 4	3335 B 2	3348 A 4	3361 A 1	3378 B 3	3400 B 4	3413 B 4	5356 A 3	6370 B 1	7400 A 4	9356 A 3	
2336 A 1	2352 A 3	2393 C 3	2411 C 4	3336 A 4	3349 A 2	3362 A 3	3379 B 1	3401 A 3	3414 C 1	5372 C 1	6371 B 2	7405 A 4	9381 C 1	
2337 A 1	2353 B 3	2397 C 3	2412 C 4	3337 A 1	3350 A 2	3363 A 1	3380 C 1	3402 A 3	3415 A 4	5373 C 1	6409 B 4	7414 C 4	9382 C 1	
2338 A 4	2354 A 2	2400 B 4	2420 B 4	3338 A 4	3351 A 2	3364 A 2	3381 C 1	3403 A 4	3416 A 4	5380 B 2	6410 A 4	7415 C 4	9383 C 4	
2340 A 3	2356 A 3	2401 A 3	3324 A 1	3339 A 1	3352 A 2	3369 B 1	3382 A 3	3404 A 4	3417 A 4	5381 C 2	7324 A 1	9300 A 2	9384 C 4	

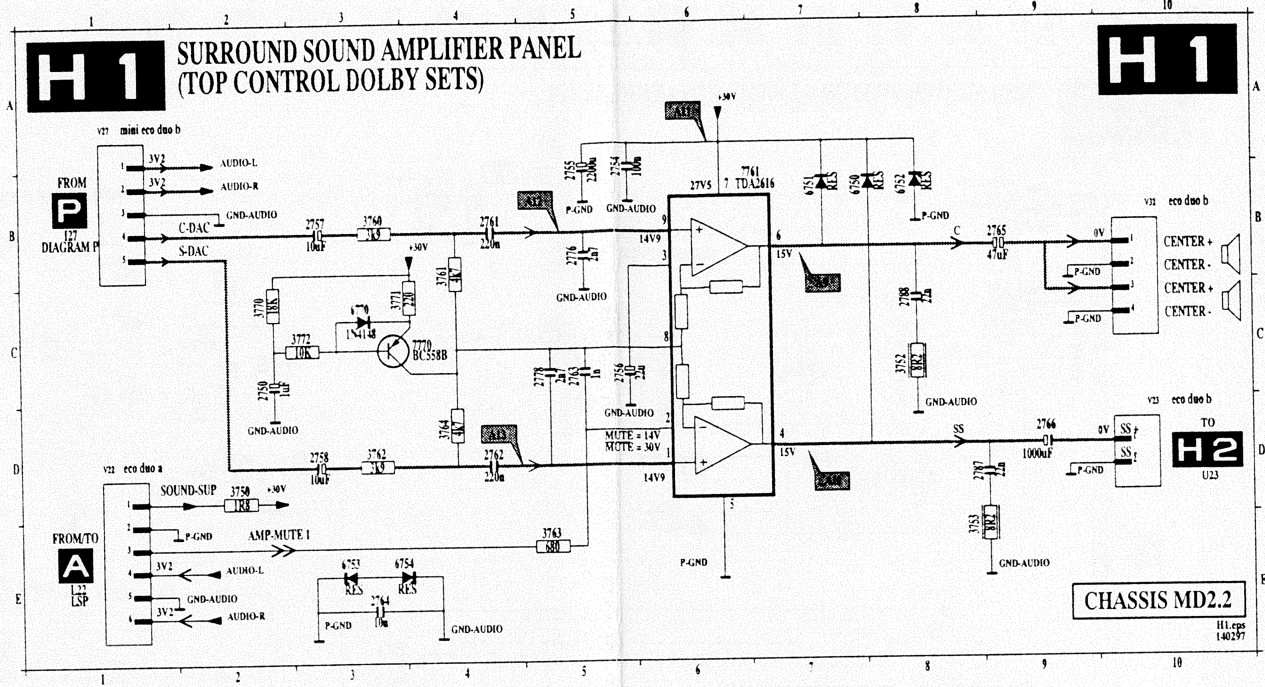

4
3
2
1
A
B
C
R40



OSC_E.AI
180396

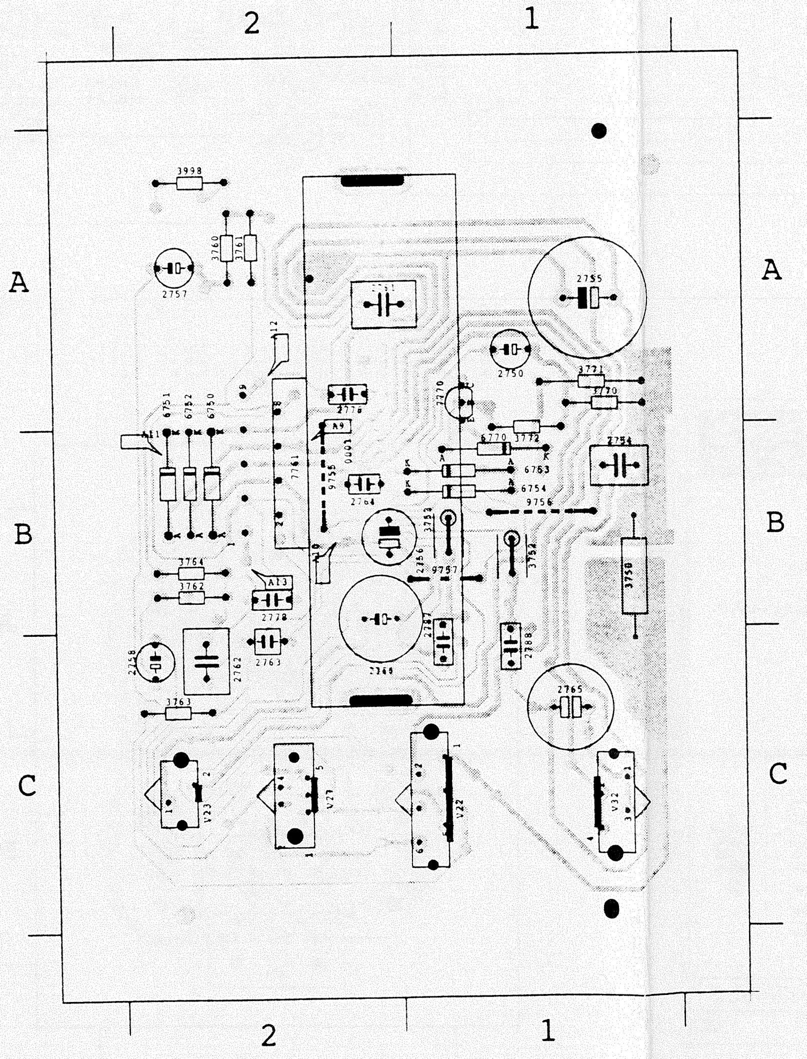
17B

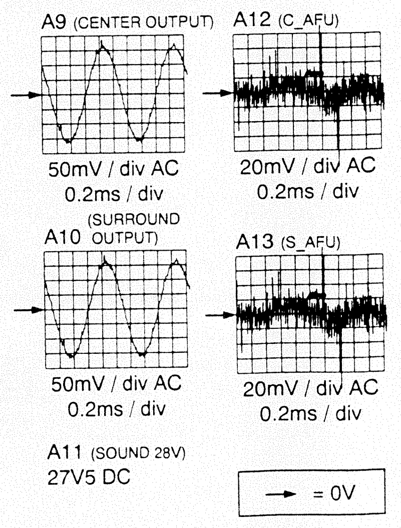
Surround sound panel / Surround Sound-Platine / Platine son Surround


H 1
SURROUND SOUND AMPLIFIER PANEL
(TOP CONTROL DOLBY SETS)
V27 mini eco duo b
FROM
P
I27
DIAGRAM P
3V2
AUDIO-L
AUDIO-R
GND-AUDIO
C-DAC
S-DAC
2757 10uF
3760 3k9
2761 220n
A12
+30V
A11
2755 2200u
2754 100n
P-GND
GND-AUDIO
27V5
7761 TDA2616
14V9
2776 2n7
3761 4K7
3770 18K
3771 220
6770 1N4148
3772 10K
7770 BC558B
2750 1uF
2778 2n7
2763 1n
2756 22u
MUTE = 14V
MUTE = 30V
A13
3764 4K7
2758 10uF
3762 3k9
2762 220n
V22 eco duo a
SOUND-SUP
3750 1R8
FROM/TO
A
L22
LSP
AMP-MUTE 1
3763 680
6753 RES
6754 RES
2764 10u
15V
A9
A10
6751 RES
6750 RES
6752 RES
2788 22n
3752 8R2
C
2765 47uF
0V
V32 eco duo b
CENTER +
CENTER -
SS
2766 1000uF
V23 eco duo b
TO
H2
U23
2787 22n
3753 8R2
CHASSIS MD2.2
H1.eps
140297

2750	C 2
2754	A 5
2755	A 5
2756	C 5
2757	B 3
2758	D 3
2761	B 4
2762	D 4
2763	C 5
2764	E 3
2765	B 9
2766	D 9
2776	B 5
2778	C 5
2787	D 8
2788	C 8
3750	D 2
3752	C 8
3753	E 8
3760	B 3
3761	B 4
3762	D 3
3763	E 5
3764	D 4
3770	C 2
3771	C 3
3772	C 3
6750	B 7
6751	B 7
6752	B 8
6753	E 3
6754	E 3
6770	C 3
7761	B 6
7770	C 4
V22	D 1
V23	D10
V27	A 1
V32	B10

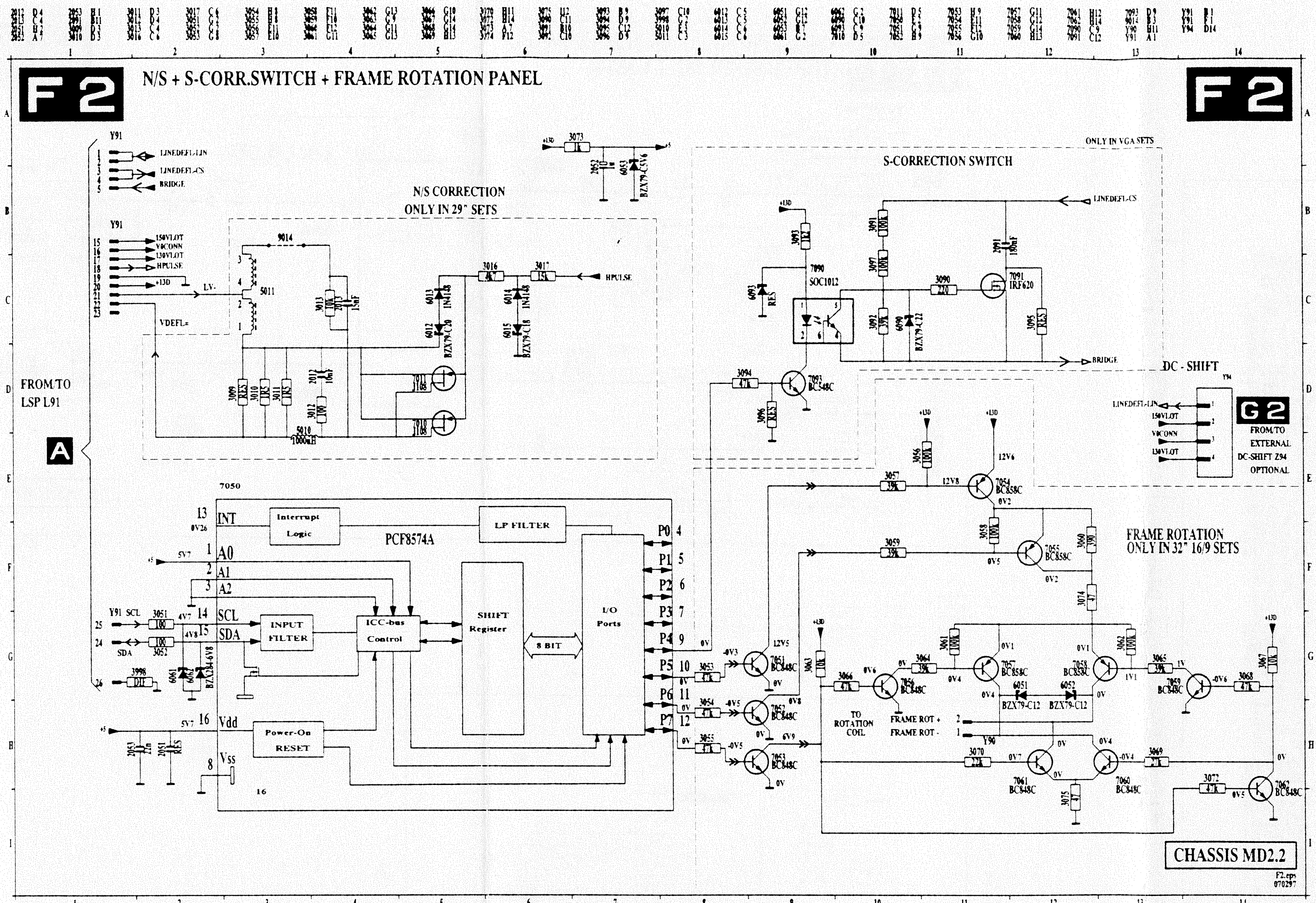
0001 A 2	2757 A 2	2764 B 2	2787 B 1	3760 A 2	3770 A 1	6751 B 2	7761 B 2	V22 C 1
2750 A 1	2758 C 2	2765 C 1	2788 C 1	3761 A 2	3771 A 1	6752 B 2	7770 A 1	V23 C 2
2754 B 1	2761 A 2	2766 B 2	3750 C 1	3762 B 2	3772 B 1	6753 B 1	9755 B 2	V27 C 2
2755 A 1	2762 C 2	2776 A 2	3752 B 1	3763 C 2	3998 A 2	6754 B 1	9756 B 1	V32 C 1
2756 B 2	2763 C 2	2778 B 2	3753 B 1	3764 B 2	6750 B 2	6770 B 1	9757 B 1	


2
1
A
B
C
3998
2757
2761
2755
2750
3772
3770
2776
A11
6751
6752
6750
7761
9755
6770
6753
6754
9756
2754
2764
3764
3762
A13
2778
2763
2762
2758
3763
9757
3752
3750
2756
2765
V23
V22
V32

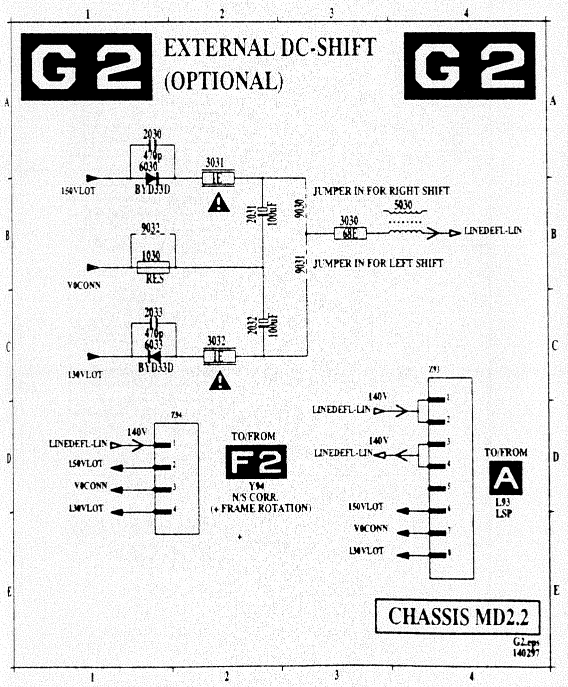


OSC_H1.AI
130396

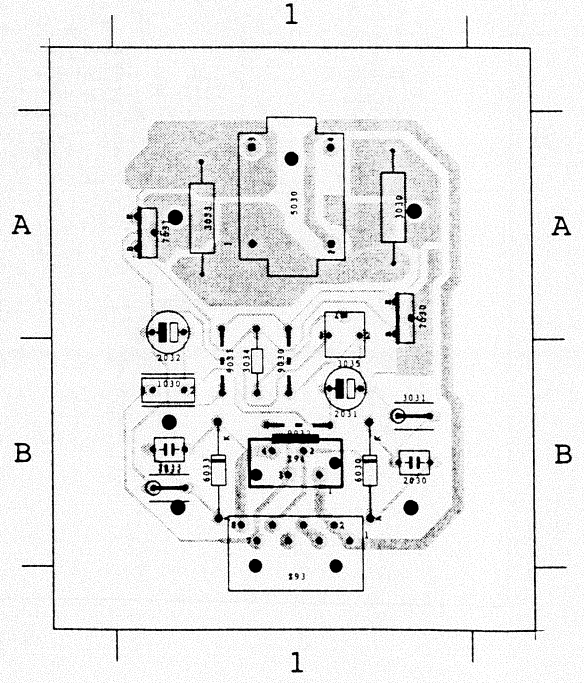
North/South + Frame rotation + S-correction panel / Nord/Süd + Drehrahmen + S-Korrekturplatine / Platine N/S + rotation de Trame + Correction S


F2
N/S + S-CORR.SWITCH + FRAME ROTATION PANEL
F2
N/S CORRECTION ONLY IN 29" SETS
S-CORRECTION SWITCH
ONLY IN VGA SETS
DC - SHIFT
G2 FROM/TO EXTERNAL DC-SHIFT Z94 OPTIONAL
FROM/TO LSP L91
A
PCF8574A
Interrupt Logic
LP FILTER
INPUT FILTER
ICC-bus Control
SHIFT Register
8 BIT
I/O Ports
Power-On RESET
FRAME ROTATION ONLY IN 32" 16/9 SETS
TO ROTATION COIL
FRAME ROT +
FRAME ROT -
CHASSIS MD2.2
F2.eps 070297

1030 B 1	2032 C 2	3031 A 2	6030 A 1	9031 B 3	Z94 D 2
2030 A 1	2033 C 1	3032 C 2	6033 C 1	9032 B 1	
2031 B 2	3030 B 3	5030 B 4	9030 B 3	Z93 C 4	

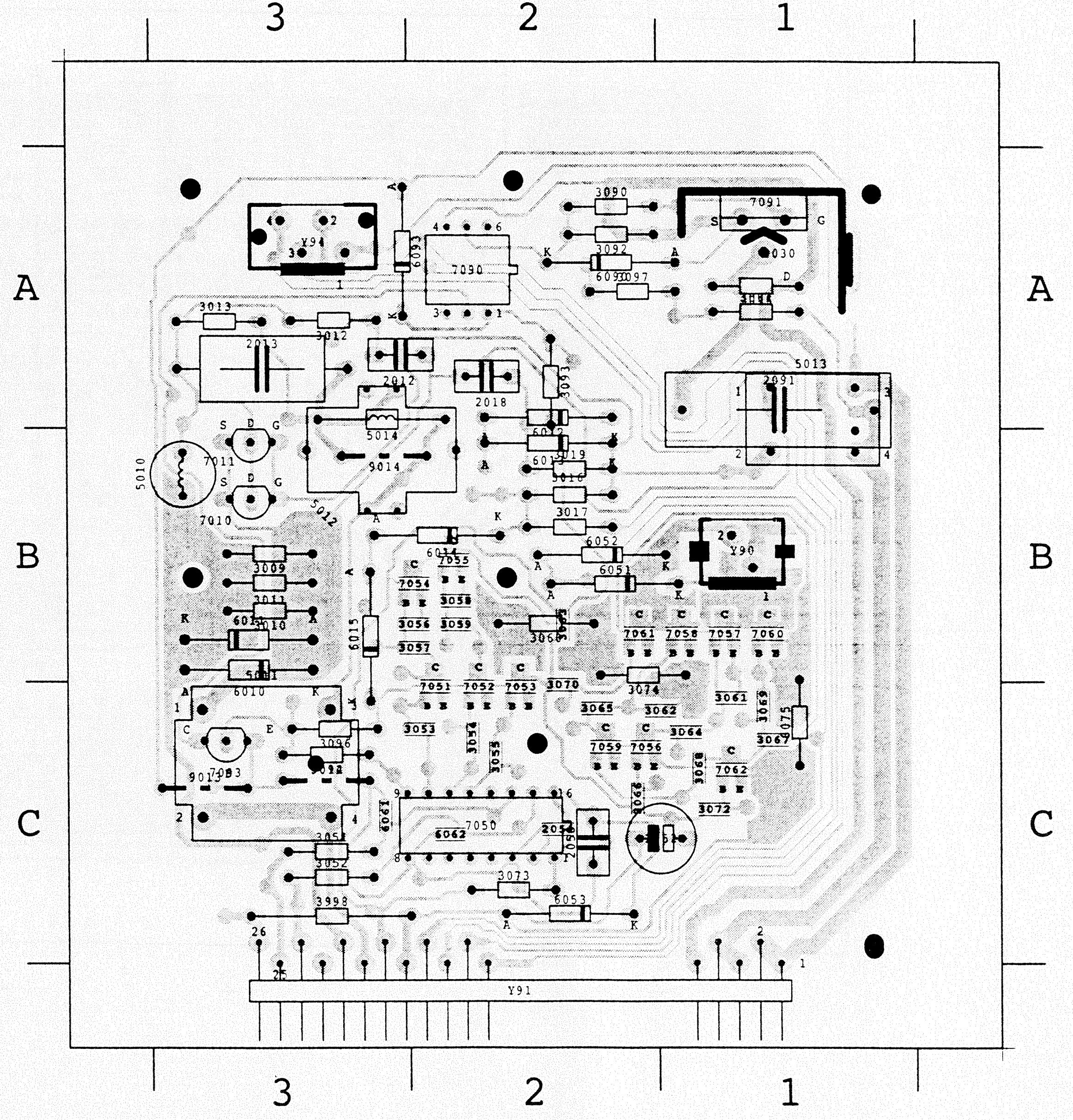

G2
EXTERNAL DC-SHIFT (OPTIONAL)
G2
JUMPER IN FOR RIGHT SHIFT
JUMPER IN FOR LEFT SHIFT
TO/FROM F2 Y94 N/S CORR (+ FRAME ROTATION)
TO/FROM A L91 LSP
CHASSIS MD2.2
G2.eps 140297

1030 B 1	2032 A 1	3031 B 1	3034 B 1	6030 B 1	7031 A 1	9032 B 1
2030 B 1	2033 B 1	3032 B 1	3035 A 1	6033 B 1	9030 A 1	Z93 B 1
2031 B 1	3030 A 1	3033 A 1	5030 A 1	7030 A 1	9031 B 1	Z94 B 1



External DC shift panel / Externe-DC-verschiebungs-Platine / Platine déphasage externe CC

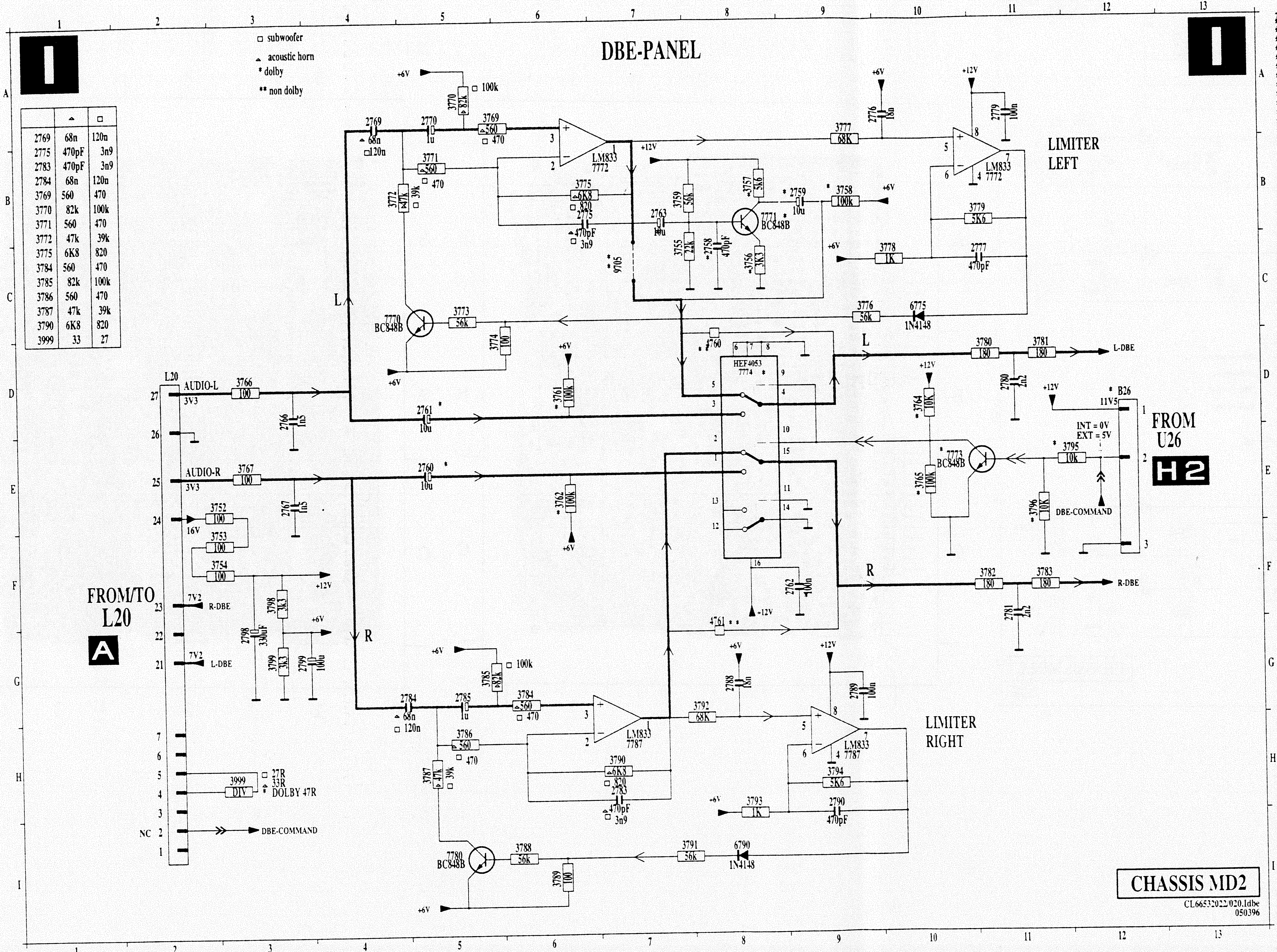
0030 A 1	3010 B 3	3053 C 2	3062 C 1	3072 C 1	3095 A 1	6010 B 3	6061 C 3	7053 C 2	7062 C 1	Y94 A 3
2012 A 2	3011 B 3	3054 C 2	3063 B 2	3073 C 2	3096 C 3	6011 B 3	6062 C 2	7054 B 2	7090 A 2	
2013 A 3	3012 A 3	3055 C 2	3064 C 1	3074 B 1	3097 A 2	6012 A 2	6090 A 1	7055 B 2	7091 A 1	
2018 A 2	3013 A 3	3056 B 2	3065 C 2	3075 C 1	3998 C 3	6013 B 2	6093 A 3	7056 C 2	7093 C 3	
2051 C 2	3016 B 2	3057 B 2	3066 C 2	3090 A 2	5010 B 3	6014 B 3	7010 B 3	7057 B 1	9012 C 3	
2052 C 1	3017 B 2	3058 B 2	3067 C 1	3091 A 1	5011 C 3	6015 B 3	7011 B 3	7058 B 1	9013 C 3	
2053 C 2	3019 B 2	3059 B 2	3068 C 1	3092 A 2	5012 A 3	6051 B 2	7050 C 2	7059 C 2	9014 B 2	
2091 A 1	3051 C 3	3060 B 2	3069 C 1	3093 A 2	5013 A 1	6052 B 2	7051 C 2	7060 B 1	Y90 B 1	
3009 B 3	3052 C 3	3061 C 1	3070 C 2	3094 C 3	5014 A 2	6053 C 2	7052 C 2	7061 B 2	Y91 C 1	


3
2
1
A
B
C
A
B
C
Y91
3
2
1

18Ω

DBE (Dynamic Bass Enhancement) panel / DBE Dynamic Bass Enhancement)-Platine

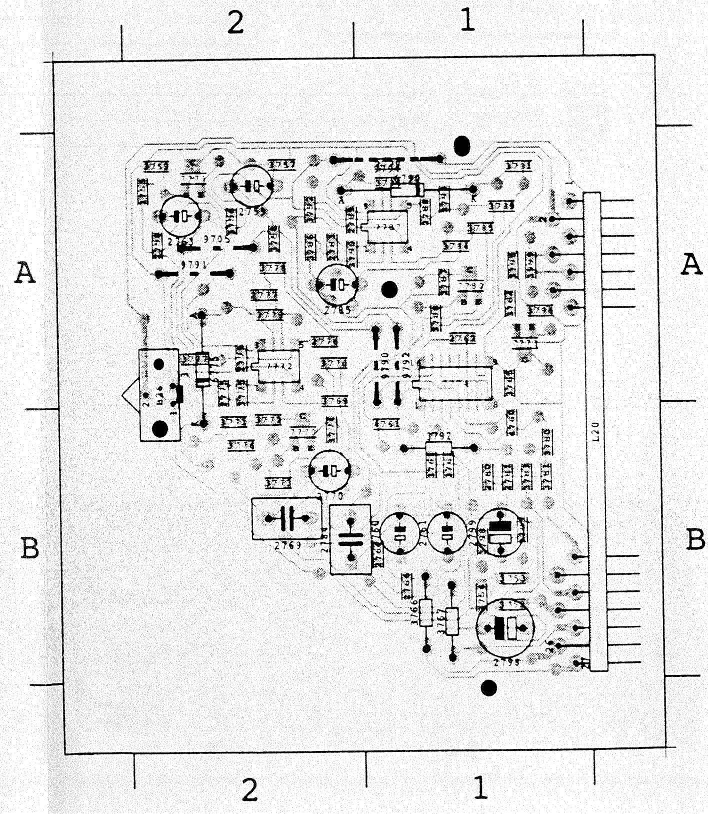
Platine DBE (Amélioration Dynamique des Basses)


DBE-PANEL
I
□ subwoofer
▵ acoustic horn
* dolby
** non dolby
LIMITER LEFT
LIMITER RIGHT
LM833 7772
LM833 7787
HEF4053 7774
BC848B
1N4148
FROM/TO L20
A
FROM U26
H2
AUDIO-L
AUDIO-R
R-DBE
L-DBE
DBE-COMMAND
INT = 0V
EXT = 5V
DOLBY 47R
+6V
+12V
-12V
CHASSIS MD2
CL66532022/020.1dbe 050396

	▵	□
2769	68n	120n
2775	470pF	3n9
2783	470pF	3n9
2784	68n	120n
3769	560	470
3770	82k	100k
3771	560	470
3772	47k	39k
3775	6K8	820
3784	560	470
3785	82k	100k
3786	560	470
3787	47k	39k
3790	6K8	820
3999	33	27

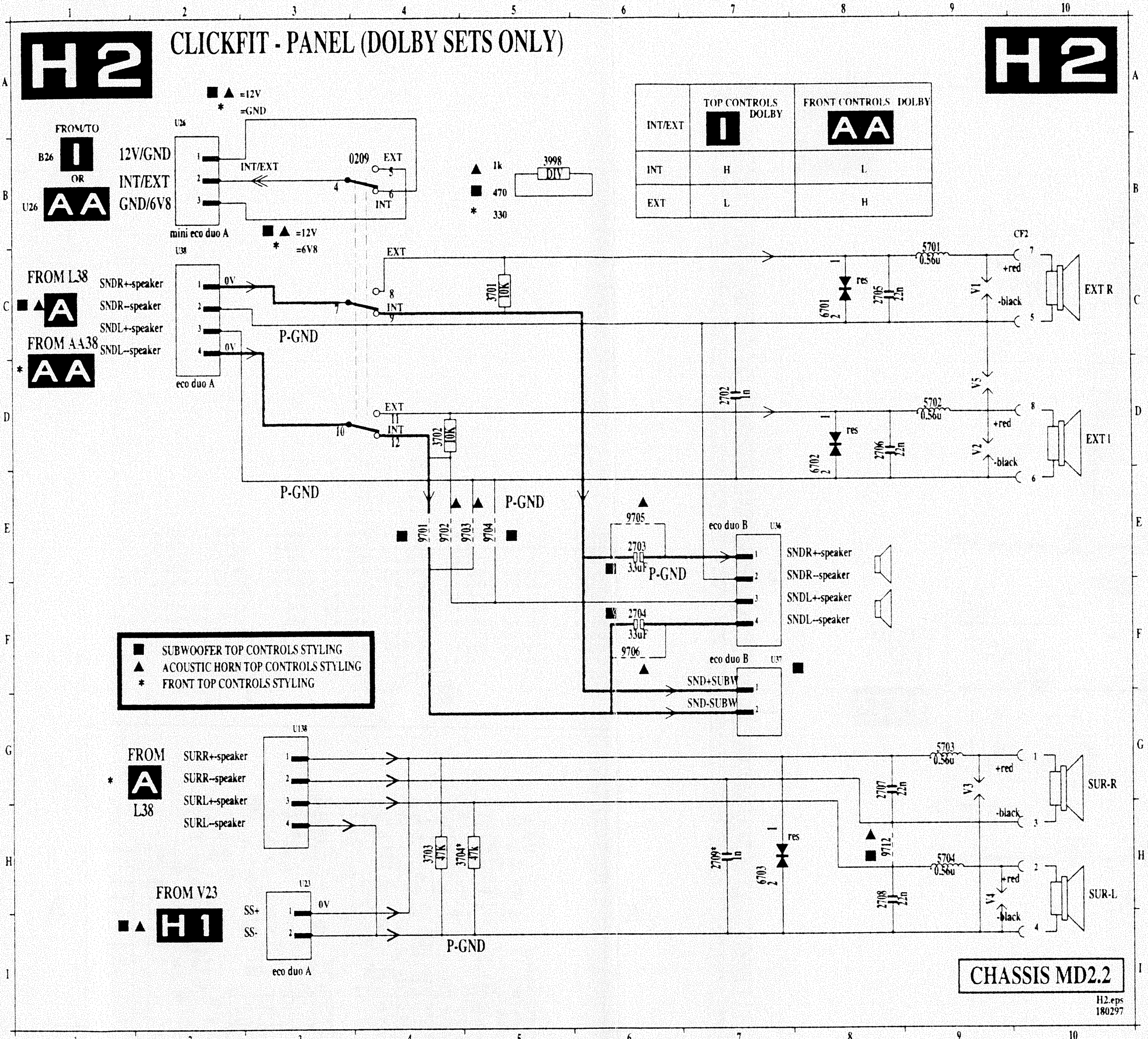
2758	C8
2759	B9
2760	E5
2761	D5
2762	F9
2763	B7
2766	D3
2767	E3
2769	A4
2770	A5
2775	B6
2776	A10
2777	C11
2779	A11
2780	D11
2781	F11
2783	H7
2784	G5
2785	G5
2788	G8
2789	G9
2790	H9
2798	G3
2799	G3
3752	E3
3753	F3
3754	F3
3755	C7
3756	C8
3757	B8
3758	B9
3759	B7
3761	D6
3762	E6
3764	D10
3765	E10
3766	D3
3767	E3
3769	A6
3770	A5
3771	B5
3772	B4
3773	C5
3774	D6
3775	B6
3776	C9
3777	A9
3778	C10
3779	B11
3780	D11
3781	D11
3782	F11
3783	F11
3784	G6
3785	G5
3786	H5
3787	H5
3788	I6
3789	I6
3790	H7
3791	I7
3792	G8
3793	H8
3794	H9
3795	E12
3796	E11
3798	F3
3799	G3
3999	H3
4760	D8
4761	G8
6775	C10
6790	I8
7770	C5
7771	B8
7772	B11
7772	B7
7773	E10
7774	D8
7780	I5
7787	H9
7787	H7
9705	C7
B26	D12
L20	D2

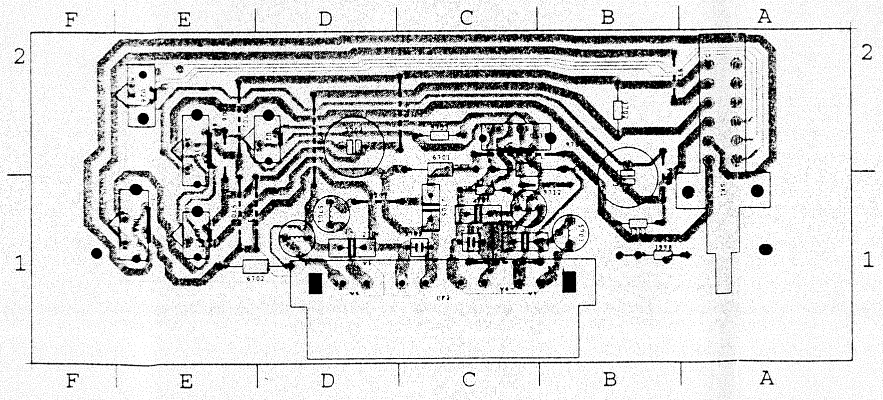
2758 A 2	2776 A 2	2798 B 1	3762 B 1	3775 A 2	3786 A 2	3798 B 1	7774 A 1
2759 A 2	2777 A 2	2799 B 1	3764 A 1	3776 B 2	3787 A 1	3799 B 1	7780 A 1
2760 B 1	2779 A 2	3752 B 1	3765 A 1	3777 A 2	3788 A 1	3999 A 1	7787 A 1
2761 B 1	2780 B 1	3753 B 1	3766 B 1	3778 A 2	3789 A 1	4760 B 1	9705 A 2
2762 A 1	2781 B 1	3754 B 1	3767 B 1	3779 A 2	3790 A 2	4761 B 1	9790 A 1
2763 A 2	2783 A 2	3755 A 2	3769 A 2	3780 B 1	3791 A 1	6775 A 2	9791 A 2
2766 B 1	2784 B 2	3756 A 2	3770 A 2	3781 B 1	3792 A 2	6790 A 2	9792 A 1
2767 B 1	2785 A 2	3757 A 2	3771 B 2	3782 B 1	3793 A 1	7770 B 2	9794 A 2
2769 B 2	2788 A 1	3758 A 2	3772 B 2	3783 B 1	3794 A 1	7771 A 2	B26 A 2
2770 B 2	2789 A 2	3759 A 2	3773 B 2	3784 A 1	3795 A 1	7772 A 2	L20 A 1
2775 A 2	2790 A 1	3761 B 1	3774 B 2	3785 A 1	3796 A 1	7773 A 1	



Clickfit panel / Clickfit-Platine / Platine borne de raccordement

2702	D 7
2703	E 6
2704	F 6
2705	C 8
2706	D 8
2707	G 8
2708	H 8
2709*	H 7
3701	C 5
3702	D 4
3703	H 4
3704*	H 5
3998	B 5
5701	C 9
5702	D 9
5703	G 9
5704	H 9
6701	C 8
6702	E 8
6703	H 7
9701	E 4
9702	E 4
9703	E 5
9704	E 5
9705	E 6
9706	F 6
9712	H 8
CF2	B10
SK1	B 3
U138	G 3
U23	H 3
U26	A 2
U36	E 7
U37	F 7
U38	C 2
V1	C 9
V2	D 9
V3	G 9
V4	H 9
V5	D 9

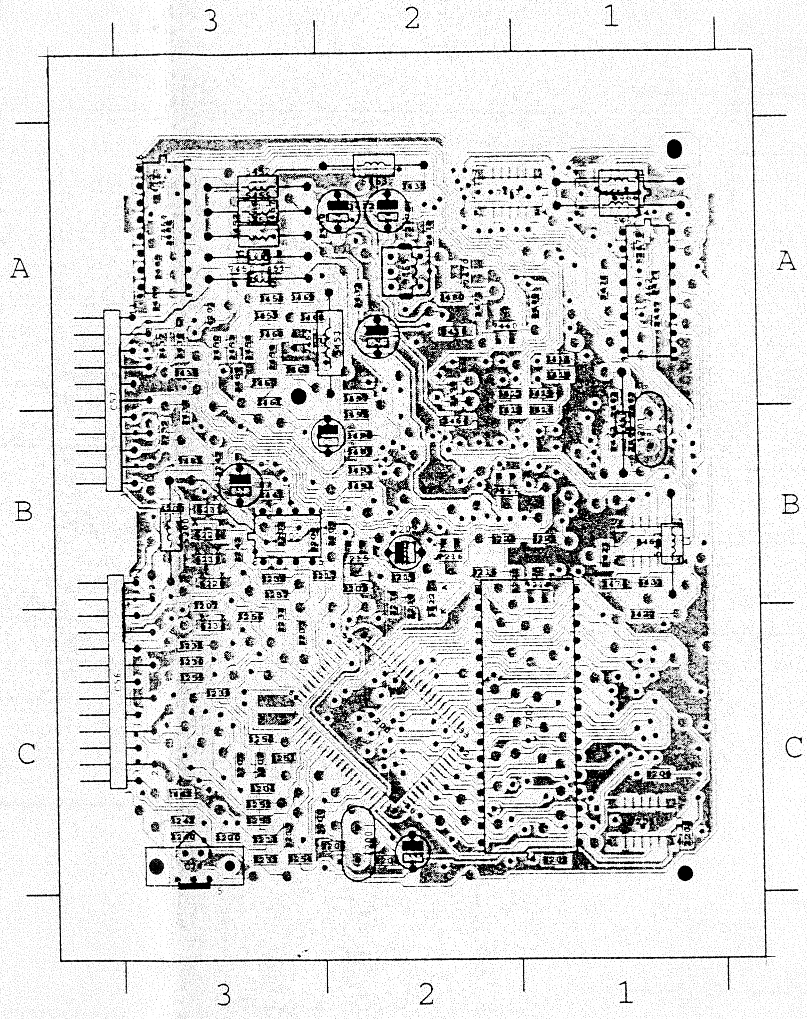

H2
CLICKFIT - PANEL (DOLBY SETS ONLY)
H2
■ ▲ =12V
* =GND
FROM/TO
B26 I
OR
U26 AA
12V/GND
INT/EXT
GND/6V8
mini eco duo A
INT/EXT
0209 EXT
INT
▲ 1k
■ 470
* 330
3998 DIV
■ ▲ =12V
* =6V8
TOP CONTROLS DOLBY
FRONT CONTROLS DOLBY
INT/EXT
I
AA
INT
H
L
EXT
L
H
FROM L38
■ ▲ A
FROM AA38
* AA
SNDR+speaker
SNDR–speaker
SNDL+speaker
SNDL–speaker
0V
P-GND
eco duo A
EXT
INT
3701 10K
5701 0.56u
CF2
+red
-black
EXT R
6701
res
2705 22n
V1
2702 1n
EXT
INT
3702 10K
5702 0.56u
6702
2706 22n
V2
EXT 1
P-GND
P-GND
9701
9702
9703
9704
9705
2703 33uF
P-GND
2704 33uF
9706
eco duo B
U36
SNDR+speaker
SNDR–speaker
SNDL+speaker
SNDL–speaker
eco duo B
U37
SND+SUBW
SND-SUBW
■ SUBWOOFER TOP CONTROLS STYLING
▲ ACOUSTIC HORN TOP CONTROLS STYLING
* FRONT TOP CONTROLS STYLING
FROM
* A
L38
U138
SURR+speaker
SURR–speaker
SURL+speaker
SURL–speaker
5703 0.56u
2707 22n
V3
SUR-R
3703 47K
3704* 47K
2709* 1n
6703
res
9712
5704 0.56u
2708 22n
V4
SUR-L
FROM V23
■ ▲ H1
U23
SS+
SS-
0V
eco duo A
P-GND
CHASSIS MD2.2
H2.eps
180297


F
E
D
C
B
A
2
1
CF2

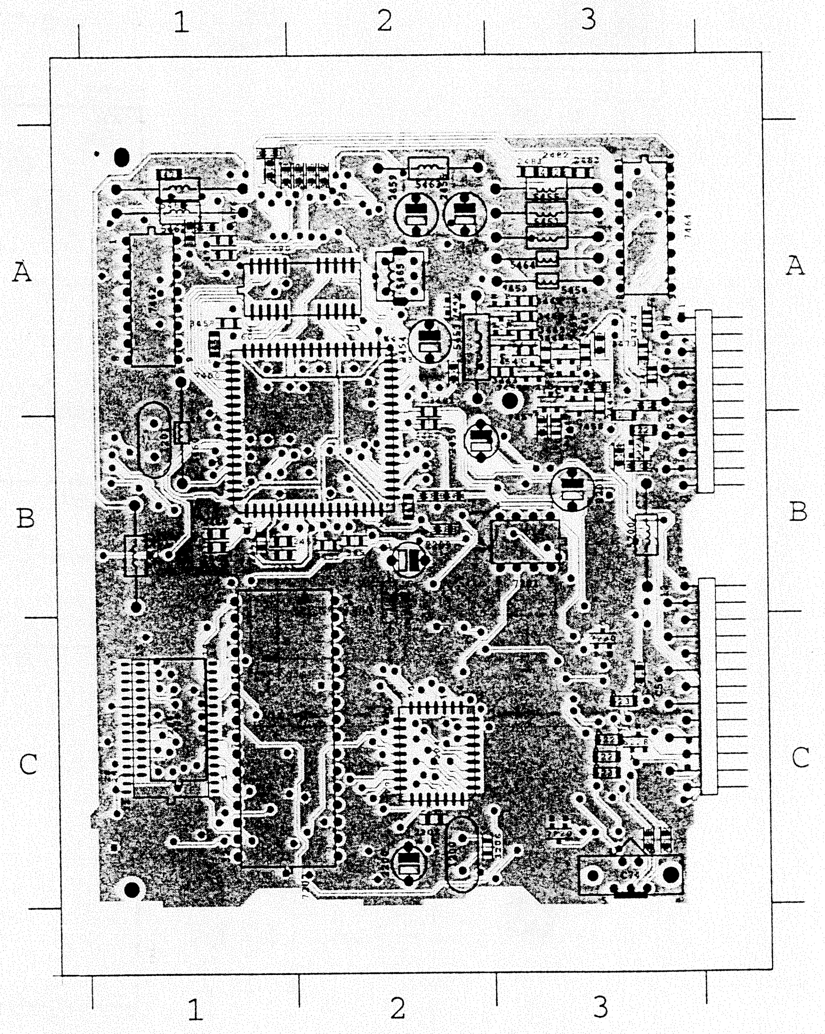
2702	C 1
2703	B 1
2704	D 2
2705	C 1
2706	D 1
2707	C 1
2708	C 1
2709	C 1
3701	B 1
3702	B 2
3703	C 2
3704	C 1
3998	B 1
5701	D 1
5702	D 1
5703	B 1
5704	C 1
6701	C 2
6702	D 1
6703	B 2
9701	C 2
9702	E 2
9703	D 1
9704	E 1
9705	B 2
9706	E 1
9707	C 1
9708	C 2
9709	D 1
9710	B 2
9711	C 1
9712	C 1
CF2	B 1
SK1	A 2
U23	D 2
U26	E 2
U36	E 2
U37	E 1
U38	E 1
U138	C 2

TXT & Control panel (control part) / TXT & Control-Platine

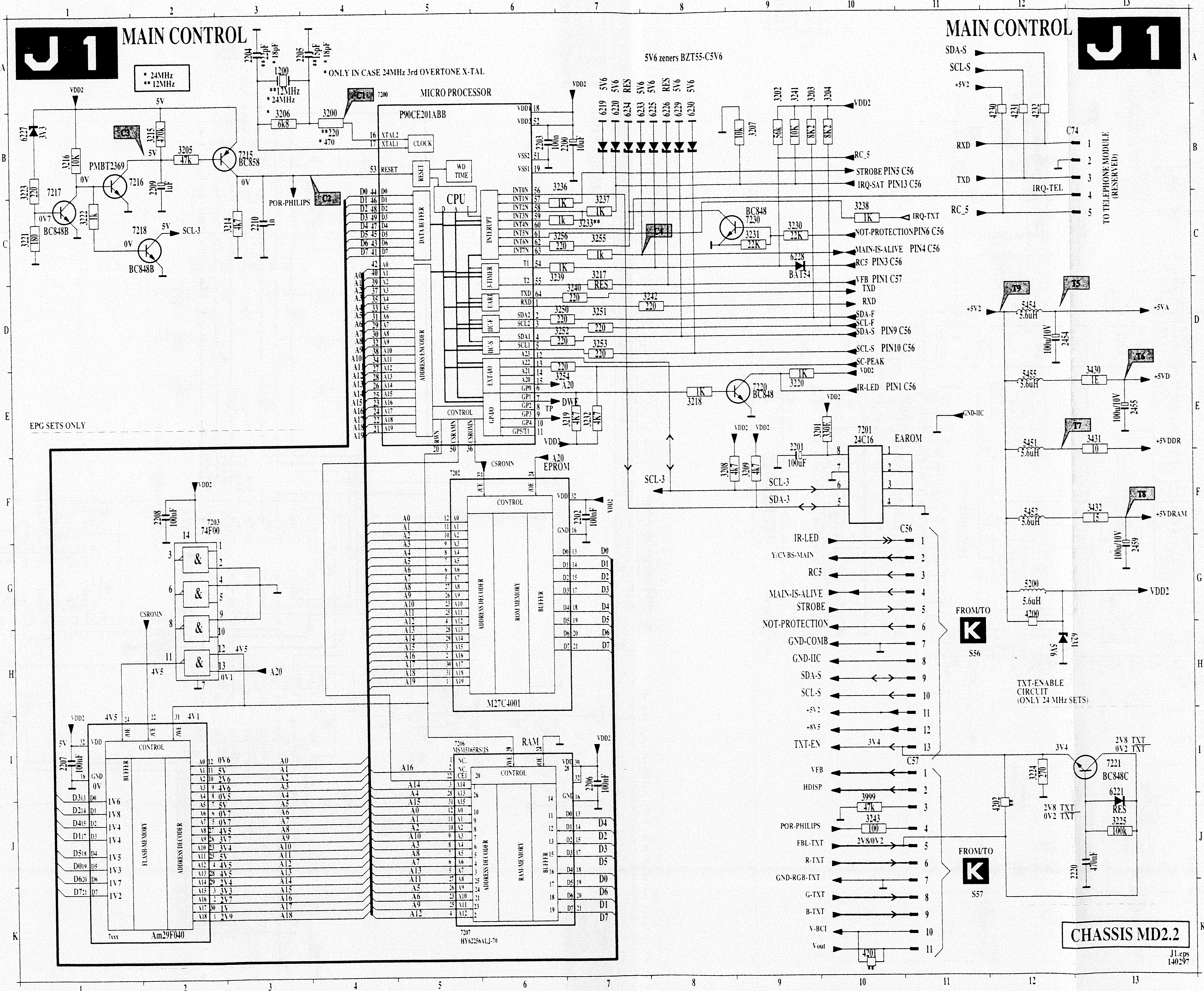
[illegible]	[illegible]
1201	B 1
2200	C 2
2201	B 3
2202	C 1
2203	B 2
2204	C 2
2205	C 2
2206	C 1
2208	C 1
2209	B 2
2210	C 2
2430	A 2
2435	A 3
2436	A 3
[illegible]	A 3
2438	B 3
2441	B 3
2442	C 3
2450	B 2
2454	A 2
2455	A 2
2456	A 3
2457	A 3
2458	A 3
2459	A 2
2460	A 3
2461	A 3
2462	B 1
2463	A 1
2464	B 2
2466	B 1
2474	B 1
2475	A 1
2476	A 2
2477	A 3
2478	A 2
2480	A 2
2484	A 3
2485	A 3
2486	A 3
2487	A 1
3200	C 3
3201	B 3
3202	C 3
[illegible]	[illegible]
3204	C 3
3205	B 2
3207	B 3
3208	B 3
3209	B 2
3214	B 2
3215	B 2
3216	B 2
3217	B 2
3218	C 3
3219	C 3
3220	C 3
3221	B 1
3222	B 2
[illegible]	[illegible]
3230	C 3
3231	C 3
3232	C 3
3233	C 3
3236	B 3
3237	B 3
3238	C 3
3239	C 3
3240	C 3
3241	B 3
3242	C 3
3243	B 3
3250	C 3
3251	C 3
3252	C 3
3253	C 3
3254	C 3
3255	C 3
3256	C 3
3410	A 1
3411	A 1
3412	B 2
3413	A 2
3414	B 1
3415	A 1
3422	C 1
3423	B 1
3430	A 2
3431	A 2
3432	A 2
3433	B 1
3435	A 2
3450	A 3
3452	A 3
3453	A 3
3455	A 2
3456	A 3
3458	A 3
3459	A 3
3460	A 3
3463	A 1
3466	A 3
3467	A 3
3468	A 3
3469	A [illegible]
3471	A 2
3477	A 1
3478	A 1
3480	A 1
3485	B 3
3489	B 2
3490	B 2
3491	B 2
3493	B 2
3495	B 2
3497	A 2
3999	B 3
4200	B 3
4201	A 3
[illegible]	[illegible]
5451	A 3
5452	A 3
5453	A 2
5454	A 3
5455	A 3
5460	B 1
5461	B 1
5462	A 1
5463	A 2
5464	A 3
5465	A 2
5466	A 1
6219	B 3
6220	B 3
[illegible]	[illegible]
6227	B 2
6231	B 3
6234	C 3
7200	C 2
7201	B 3
7202	C 2
7203	C 1
7215	B 2
7216	B 2
7217	B 2
7218	B 1
7450	A 3
7451	A 3
7452	A 3
[illegible]	A [illegible]
7461	B [illegible]
7462	A [illegible]
7463	A [illegible]
7464	A [illegible]
7465	A [illegible]
7470	A [illegible]
C56	C 3
C57	B 3
C74	C 3


3
2
1
A
B
C
3
2
1
A
B
C

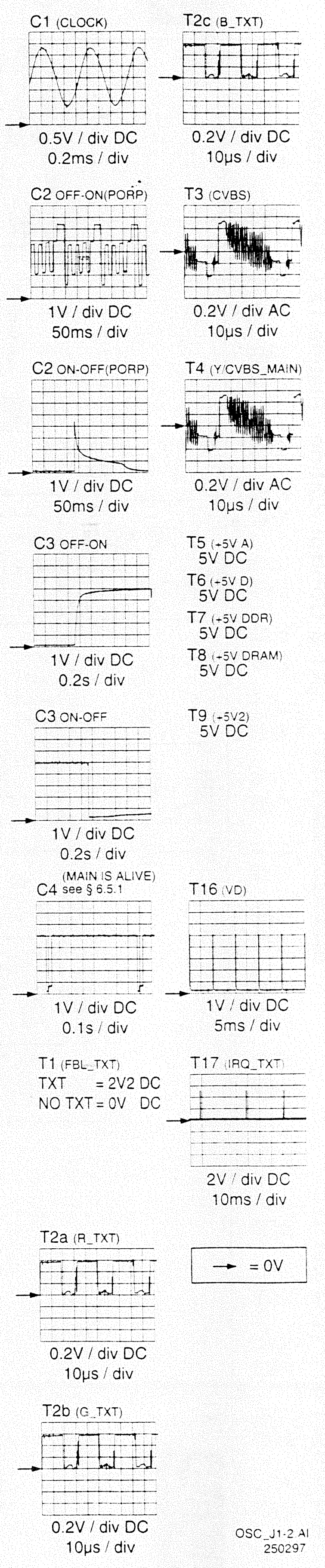
1200	C 2
1201	B 1
2200	C 2
2201	B 3
2207	C 2
2209	B 2
2220	B 3
2450	B 2
2451	B 1
2452	B 1
2453	A 1
2454	A 2
2455	A 2
2459	A 2
2465	B 1
2468	B 1
2469	B 1
2472	B 2
2479	A 1
2481	A 3
2482	A 3
2483	A 3
3206	C 2
3224	B 3
3225	A 3
3416	A 2
3417	A 2
3418	A 1
3419	A 2
3420	A 1
3421	A 1
3434	A 1
3436	A 1
3437	B 3
3438	A 3
3439	A 3
3440	A 2
3441	A 3
3442	A 3
3443	A 3
3444	A 3
3445	A 3
3446	A 3
3447	B 3
3448	A 3
3449	A 3
3451	B 2
3454	B 2
3457	A 1
3472	A 3
3473	A 3
3474	A 3
3475	A 1
3476	A 1
3481	A 2
3482	B 2
3483	B 2
3484	B 2
3486	B 2
4202	B 3
4230	C 3
4231	C 3
4232	C 3
5200	B 3
5451	A 3
5452	A 3
5453	A 2
5454	A 3
5455	A 3
5460	B 1
5461	B 1
5462	A 1
5463	A 2
5464	A 3
5465	A 2
5466	A 1
6221	B 3
6225	C 3
6228	C 3
6229	C 3
6230	C 3
6233	C 3
7201	B 3
7202	C 2
7204	C 2
7206	C 1
7207	C 1
7220	C 3
7221	B 3
7230	C 3
7400	B 2
7449	A 2
7453	A 3
7454	A 3
7455	A 3
7456	A 3
7457	A 3
7458	A 3
7459	A 3
7462	A 1
7464	A 3
7490	A 2
C56	C 3
C57	B 3
C74	C 3


1
2
3
A
B
C
1
2
3
A
B
C

Platine TXT & Commande

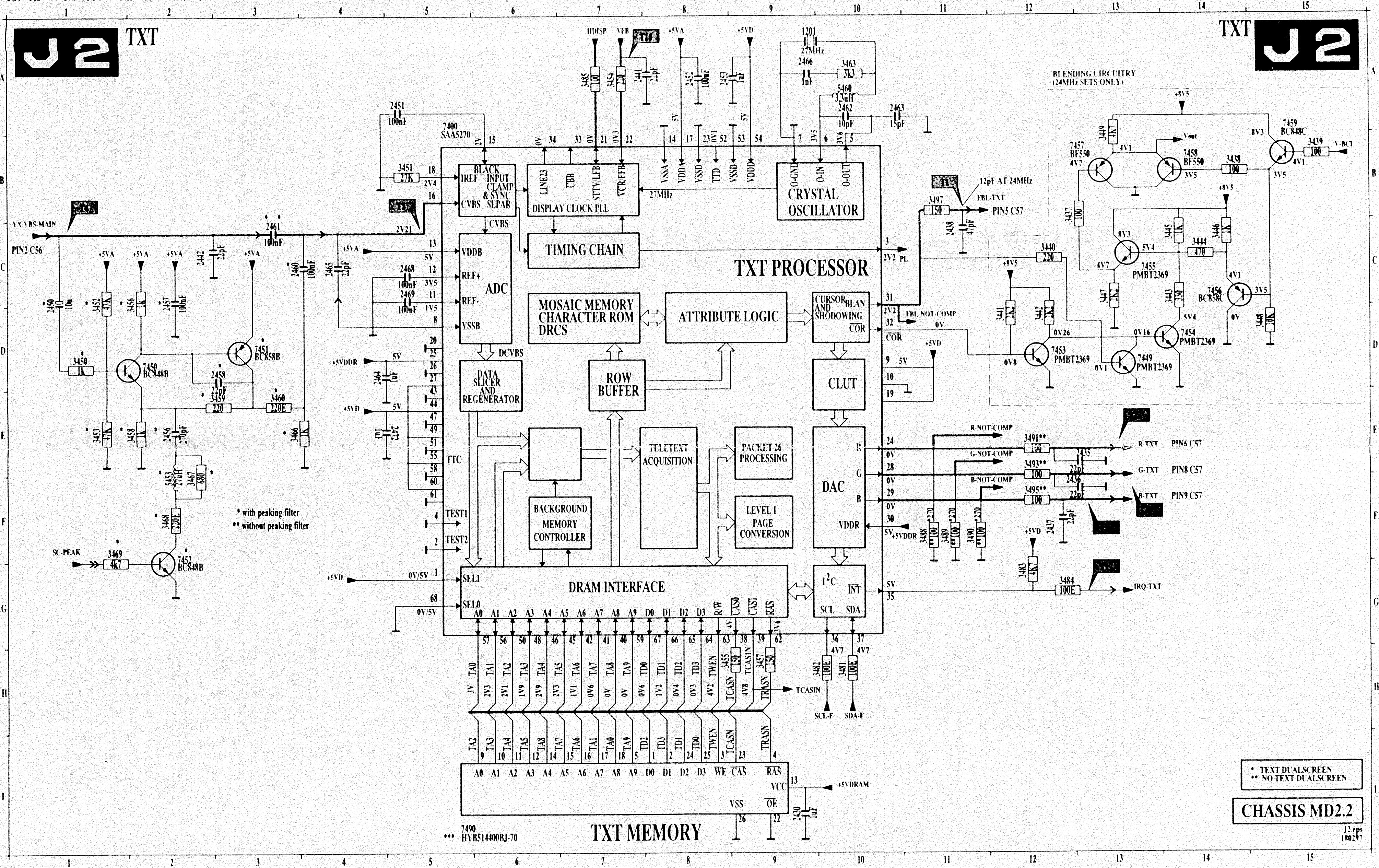

J 1
MAIN CONTROL
* 24MHz
** 12MHz
* ONLY IN CASE 24MHz 3rd OVERTONE X-TAL
MICRO PROCESSOR
P90CE201ABB
CPU
CLOCK
WD TIME
RESET
DATA BUFFER
ADDRESS ENCODER
INTERUPT
TIMER
UART
I2C-F
I2C-S
EXT-I/O
GP-I/O
CONTROL
5V6 zeners BZT55-C5V6
PMBT2369
BC858
BC848B
POR-PHILIPS
SCL-3
EPG SETS ONLY
74F00
CSROMN
EPROM
M27C4001
ROM MEMORY
ADDRESS DECODER
BUFFER
FLASH-MEMORY
Am29F040
RAM
RAM MEMORY
MSM51665RSJS
HY6225xALJ-70
EAROM
24C16
SDA-3
SDA-S
SCL-S
RXD
TXD
RC_5
IRQ-TEL
C74
TO TELEPHONE MODULE (RESERVED)
RC_5
STROBE PIN5 C56
IRQ-SAT PIN13 C56
IRQ-TXT
NOT-PROTECTION PIN6 C56
MAIN-IS-ALIVE PIN4 C56
RC5 PIN3 C56
VFB PIN1 C57
SDA-S PIN9 C56
SCL-S PIN10 C56
SC-PEAK
IR-LED PIN1 C56
GND-IIC
+5VA
+5VD
+5VDDR
+5VDRAM
VDD2
C56
IR-LED
Y/CVBS-MAIN
RC5
MAIN-IS-ALIVE
STROBE
NOT-PROTECTION
GND-COMB
GND-IIC
SDA-S
SCL-S
+5V2
+8V5
TXT-EN
FROM/TO K S56
TXT-ENABLE CIRCUIT (ONLY 24 MHz SETS)
C57
VFB
HDISP
POR-PHILIPS
FBL-TXT
R-TXT
GND-RGB-TXT
G-TXT
B-TXT
V-BCI
Vout
FROM/TO K S57
BC848C
CHASSIS MD2.2
J1.eps
140297

1200	A 3
2200	B 7
2201	E 9
2202	F 7
2203	B 6
2204	A 3
2205	A 4
2206	I 7
2207	I 1
2208	F 2
2209	B 2
2210	C 3
2220	J13
2454	D12
2455	E13
2459	G13
3200	B 4
3201	E10
3202	A 9
3203	A10
3204	A10
3205	B 2
3206	B 3
3207	B 9
3208	F 8
3209	F 9
3214	C 3
3215	B 2
3216	B 1
3217	C 7
3218	E 8
3219	E 7
3220	E 9
3221	C 1
3222	C 1
3223	B 1
3224	I12
3225	J13
3230	C 9
3231	C 9
3232	E 7
3233	C 7
3236	B 7
3237	C 7
3238	C10
3239	C 7
3240	D 7
3241	A 9
3242	D 8
3243	J10
3250	D 7
3251	D 7
3252	D 7
3253	D 7
3254	E 7
3255	C 7
3256	C 7
3430	E13
3431	E13
3432	F13
3999	J10
4200	G12
4201	K10
4202	J12
4230	B12
4231	B12
4232	B12
5200	G12
5451	E12
5452	F12
5454	D12
5455	E12
6219	A 7
6220	A 7
6221	J13
6225	A 8
6226	A 8
6227	B 1
6228	C 9
6229	A 8
6230	A 8
6231	H12
6233	A 8
6234	A 7
7200	A 4
7201	E10
7202	F 5
7203	F 3
7204	K 1
7206	I 5
7207	K 5
7215	B 3
7216	B 1
7217	B 1
7218	C 1
7220	E 9
7221	I13
7230	C 9
C56	F10
C57	I11
C74	B12



TXT & Control panel (TXT part) / MD 2.21/2.22/2.23 21 TXT & Control-Platine / Platine TXT & Commande

1201	A 9
2430	I 9
2435	E13
2436	F12
2437	F12
2438	C11
2441	A 7
2442	C 2
2450	C 1
2451	A 5
2452	A 8
2453	A 8
2456	E 2
2457	C 2
2458	D 3
2460	C 3
2461	C 3
2462	A10
2463	A10
2464	D 4
2465	C 4
2466	A 9
2468	C 5
2469	C 5
2472	E 5
3437	B12
3438	B14
3439	B15
3440	C12
3441	D12
3442	D12
3443	C14
3444	C14
3445	C14
3446	C14
3447	C13
3448	D15
3449	A13
3450	D 1
3451	B 5
3452	C 1
3453	E 1
3454	A 7
3455	H 8
3456	C 2
3457	H 9
3458	E 2
3459	E 3
3460	E 3
3463	A10
3466	E 3
3467	E 2
3468	F 2
3469	F 1
3481	H10
3482	H10
3483	G12
3484	G12
3485	A 7
3488	F11
3489	F11
3490	F11
3491*	E12
3493*	E12
3495*	F12
3497	B11
5453	E 2
5460	A10
7400	A 5
7449	D13
7450	D 2
7451	D 3
7452	F 2
7453	D12
7454	D14
7455	C13
7456	C14
7457	B12
7458	B14
7459	A15
7490	I 5


J2
TXT
TXT
J2
HDISP
VFB
+5VA
+5VD
1201
27MHz
Y/CVBS-MAIN
PIN2 C56
7400
SAA5270
BLACK INPUT CLAMP & SYNC SEPAR
IREF
CVBS
LINE23
CBB
DISPLAY CLOCK PLL
STTV/LFB
VCR/FFB
27MHz
VSSA
VDDA
VSSD
TTD
VSSD
VDDP
O-GND
O-IN
O-OUT
CRYSTAL OSCILLATOR
TIMING CHAIN
TXT PROCESSOR
VDDB
REF+
REF-
VSSB
ADC
DCVBS
MOSAIC MEMORY CHARACTER ROM DRCS
ATTRIBUTE LOGIC
CURSOR AND BLAN SHADOWING COR
DATA SLICER AND REGENERATOR
ROW BUFFER
CLUT
TTC
TELETEXT ACQUISITION
PACKET 26 PROCESSING
LEVEL 1 PAGE CONVERSION
BACKGROUND MEMORY CONTROLLER
DAC
R
G
B
VDDR
TEST1
TEST2
SEL1
SEL0
DRAM INTERFACE
I²C
INT
SCL
SDA
A0 A1 A2 A3 A4 A5 A6 A7 A8 A9 D0 D1 D2 D3 R/W CAS0 CAS1 RAS
TWEN
TCASN
TRASN
TCASIN
SCL-F
SDA-F
+5VDRAM
7490
HYB514400BJ-70
TXT MEMORY
VCC
VSS
OE
WE
CAS
RAS
BLENDING CIRCUITRY (24MHz SETS ONLY)
+8V5
V-BCL
7457 BF550
7458 BF550
7459 BC848C
7455 PMBT2369
7456 BC858C
7453 PMBT2369
7449 PMBT2369
7454 PMBT2369
7450 BC848B
7451 BC858B
7452 BC848B
12pF AT 24MHz
FBL-TXT
PIN5 C57
FBL-NOT-COMP
R-NOT-COMP
G-NOT-COMP
B-NOT-COMP
R-TXT
G-TXT
B-TXT
PIN6 C57
PIN8 C57
PIN9 C57
IRQ-TXT
SC-PEAK
* TEXT DUALSCREEN
** NO TEXT DUALSCREEN
CHASSIS MD2.2
J2 eps 180297

* with peaking filter
** without peaking filter

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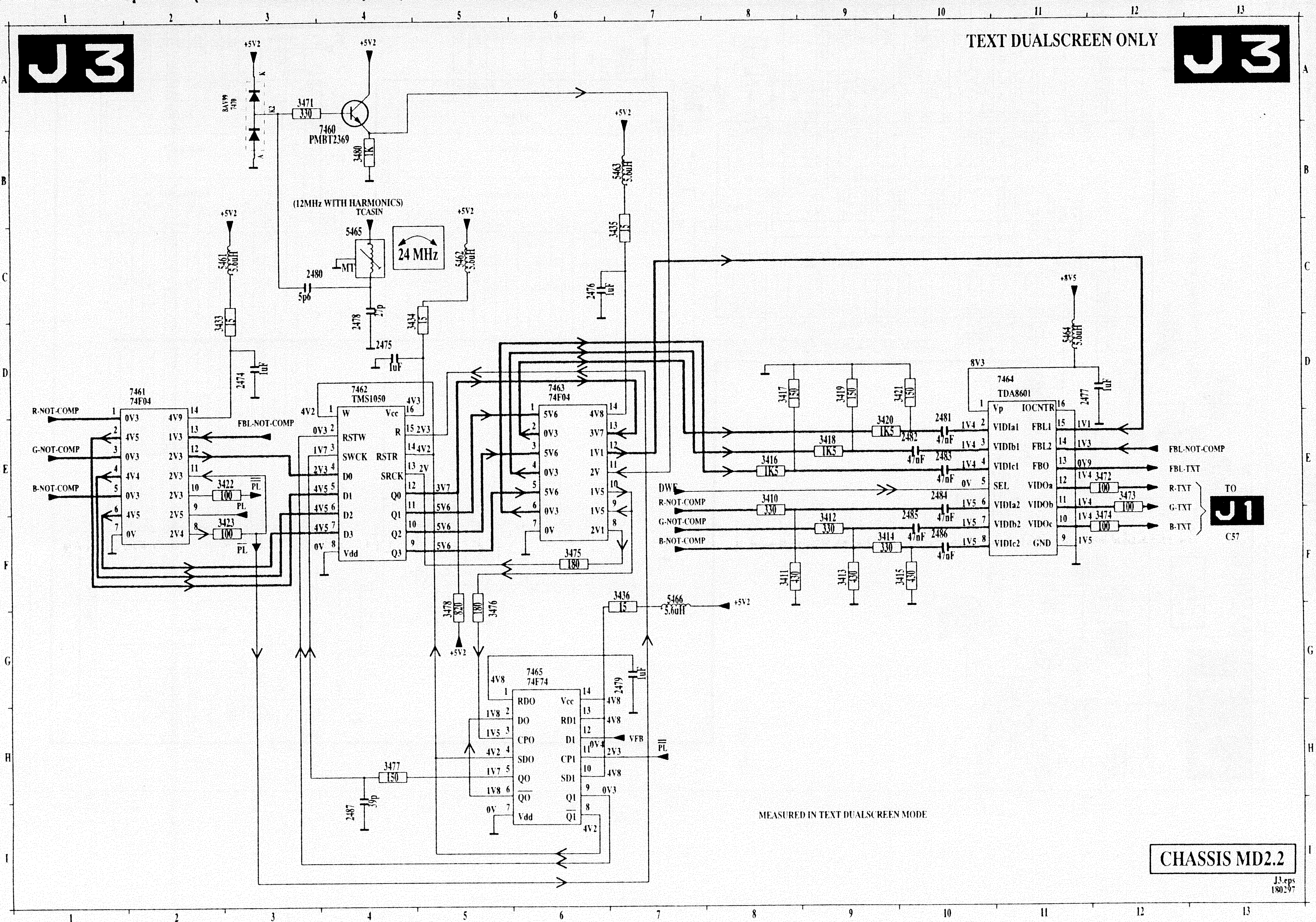
TXT & Control panel (text DualScreen part) / MD 2.21/2.22/2.23 22 TXT & Control-Platine / Platine TXT & Commande


J3
TEXT DUALSCREEN ONLY
J3
+5V2
BAV99
7470
3471
7460
PMBT2369
3480
(12MHz WITH HARMONICS)
TCASIN
5465
24 MHz
2480
5p6
7461
74F04
7462
TMS1050
7463
74F04
7464
TDA8601
7465
74F74
R-NOT-COMP
G-NOT-COMP
B-NOT-COMP
FBL-NOT-COMP
FBL-TXT
R-TXT
G-TXT
B-TXT
TO
J1
C57
W
RSTW
SWCK
RSTR
SRCK
D0 D1 D2 D3
Q0 Q1 Q2 Q3
Vcc
Vdd
Vp
IOCNTR
VIDIa1
VIDIb1
VIDIc1
SEL
VIDIa2
VIDIb2
VIDIc2
FBL1
FBL2
FBO
VIDOa
VIDOb
VIDOc
GND
RDO
DO
CPO
SDO
QO
RD1
D1
CP1
SD1
Q1
VFB
PL
DW
+8V5
MEASURED IN TEXT DUALSCREEN MODE
CHASSIS MD2.2
J3 eps 180297

2474	D 3
2475	D 4
2476	C 6
2477	D11
2478	C 4
2479	G 7
2480	C 3
2481	E10
2482	E10
2483	E10
2484	E10
2485	F10
2486	F10
2487	I 4
3410	E 8
3411	F 8
3412	F 9
3413	F 9
3414	F 9
3415	F10
3416	E 8
3417	D 8
3418	E 9
3419	D 9
3420	E 9
3421	D10
3422	E 3
3423	F 3
3433	C 3
3434	C 5
3435	C 7
3436	F 7
3471	A 3
3472	E12
3473	E12
3474	F12
3475	F 6
3476	F 5
3477	H 4
3478	F 5
3480	B 4
5461	C 3
5462	C 5
5463	B 7
5464	D11
5465	C 4
5466	F 7
7460	B 4
7461	D 2
7462	D 4
7463	D 6
7464	D11
7465	G 6
7470	A 3

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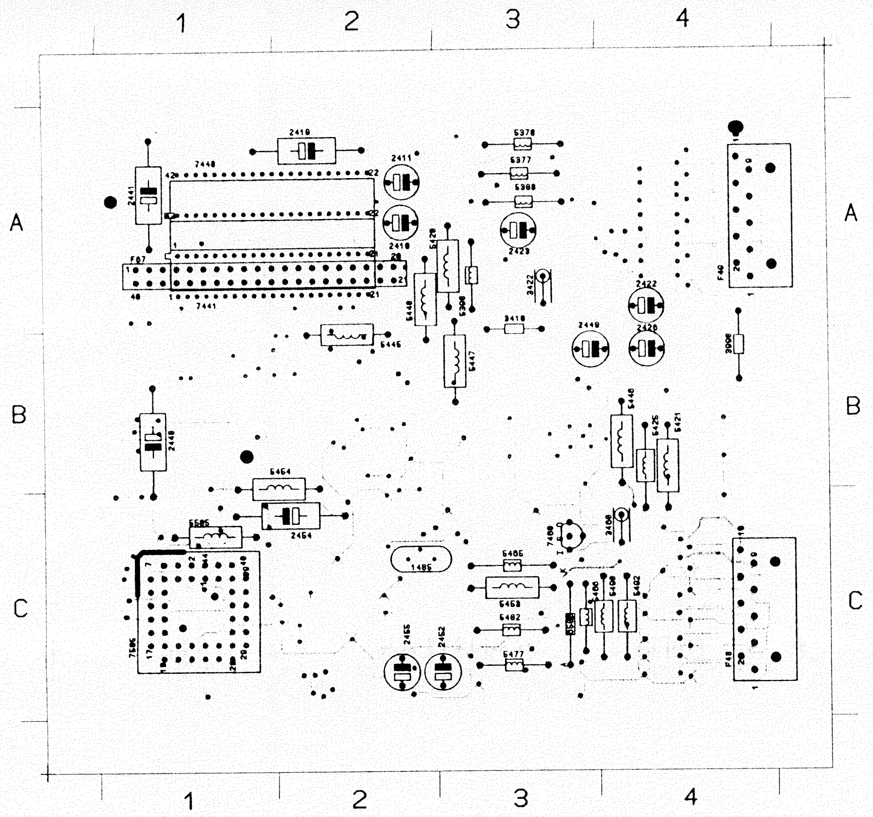
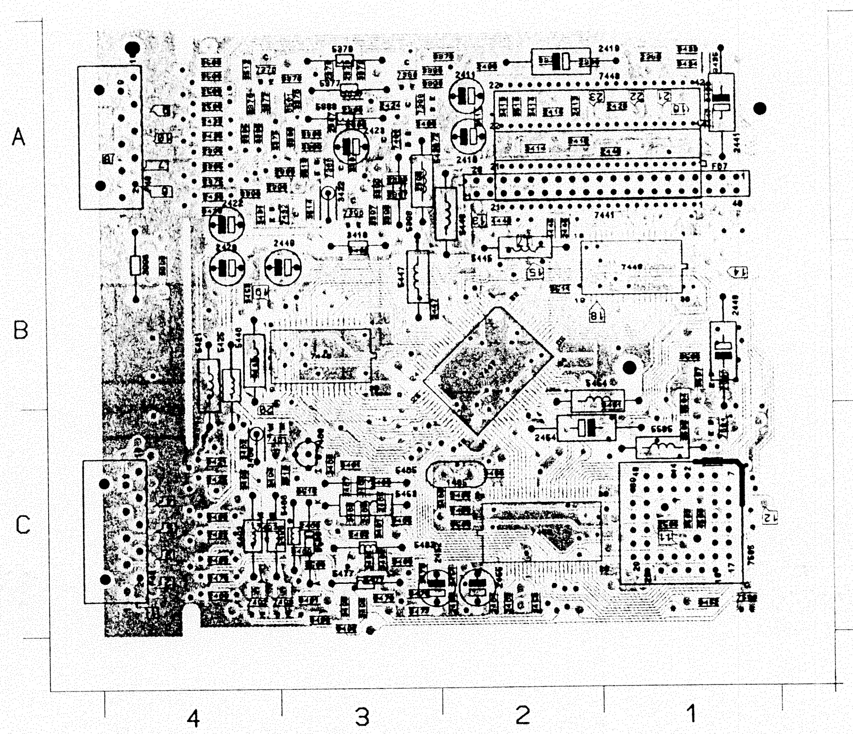
Feature Box (Digital Scan) panel /
Feature-Box-Platine (Digital Scan) /
Platine Boîtier Numérique (balayage numérique)

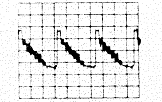

1
2
3
4
A
B
C
2410
7440
2411
2441
2418
F67
7441
5378
5377
5380
2423
5420
5390
3422
3410
5440
5446
5447
2422
2426
2449
3908
F49
2440
5464
2464
5505
7505
1485
5465
5440
5425
5421
5466
5453
5482
7460
3460
2455
2452
5477
F48

1485 C 2	2419 A 1	2426 B 4	2449 B 3	2455 C 2	3460 C 4	5378 A 3	5420 A 3	5440 B 2	5447 A 3	5465 C 3	5482 C 3	5505 C 1	7441 A 1	F48 C 4
2410 A 2	2422 A 4	2441 A 1	2452 C 3	3410 A 3	3908 B 4	5380 A 3	5421 C 4	5445 B 2	5453 C 3	5466 C 3	5490 C 4	6500 C 3	7460 C 3	F49 A 4
2411 A 2	2423 A 3	2448 B 1	2454 C 2	3422 A 3	5377 A 3	5390 A 3	5425 C 4	5446 B 4	5454 B 1	5477 C 3	5492 C 4	7440 A 1	7505 C 1	F67 A 1


4
3
2
1
A
B
C
5378
2410
2411
7440
7441
2441
F67
2423
2422
2418
2440
2449
5447
3410
5440
5445
2448
2464
5505
1485
5465
5453
5482
7505
F48

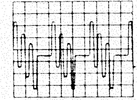
1485 C 2	2396 A 3	2422 A 4	2449 B 3	2469 C 4	2509 A 4	3388 A 3	3430 A 4	3465 C 3	3492 C 3	3511 B 2	5380 A 3	5482 C 3	7441 A 1	F48 C 4
2375 A 4	2397 A 3	2423 A 3	2450 C 2	2476 C 3	2510 C 3	3389 A 3	3431 A 4	3466 C 3	3493 C 3	3512 A 4	5390 A 3	5490 C 4	7445 B 1	F49 A 4
2376 A 4	2398 A 3	2424 A 3	2451 C 2	2477 C 3	3370 A 2	3390 A 3	3432 B 3	3467 C 3	3494 C 4	3513 A 3	5420 A 3	5492 C 4	7446 B 3	F67 A 1
2377 A 3	2399 A 3	2425 C 4	2452 C 3	2478 C 4	3371 A 2	3395 A 4	3433 A 1	3468 C 3	3495 C 4	3514 A 3	5421 C 4	5505 C 1	7447 B 2	
2378 A 3	2400 A 2	2426 B 4	2453 C 2	2481 C 3	3372 A 3	3396 A 4	3434 A 1	3469 C 3	3500 C 3	3515 C 3	5425 C 4	6500 C 3	7450 C 2	
2379 A 3	2410 A 2	2430 A 4	2454 C 2	2482 C 3	3375 A 4	3397 A 3	3435 A 1	3475 C 3	3502 C 1	3908 B 4	5440 B 2	6501 A 3	7460 C 3	
2380 A 1	2411 A 2	2433 A 4	2455 C 2	2483 C 4	3376 A 3	3398 A 3	3436 A 1	3476 C 3	3503 C 2	3909 B 4	5445 B 2	7376 A 4	7461 C 4	
2385 A 4	2412 A 2	2435 A 4	2460 C 3	2485 C 2	3377 A 4	3399 A 3	3450 C 2	3477 C 3	3504 B 1	4445 A 2	5446 B 4	7380 A 3	7490 C 3	
2386 A 3	2413 A 2	2440 A 1	2462 C 2	2486 C 2	3378 A 3	3400 A 3	3451 C 1	3480 C 3	3505 C 1	4446 A 2	5447 A 3	7386 A 3	7492 C 4	
2387 A 3	2414 A 2	2441 A 1	2464 C 2	2490 C 4	3379 A 3	3410 A 3	3452 C 1	3481 C 3	3506 B 1	4447 A 1	5453 C 3	7390 A 3	7493 C 4	
2388 A 3	2415 A 2	2445 A 2	2465 C 3	2492 C 4	3380 A 3	3411 A 2	3453 B 4	3482 C 3	3507 B 1	4505 C 1	5454 B 1	7396 A 3	7500 C 1	
2389 A 3	2419 A 1	2446 B 4	2466 C 3	2493 C 3	3385 A 4	3413 A 2	3460 C 4	3485 C 2	3508 A 4	4506 C 1	5465 C 3	7400 A 3	7504 C 1	
2390 A 2	2420 A 1	2447 B 3	2467 C 3	2505 C 1	3386 A 3	3414 A 2	3461 C 3	3490 C 3	3509 A 4	5377 A 3	5466 C 3	7432 A 3	7505 C 1	
2395 A 4	2421 C 4	2448 B 1	2468 C 3	2508 A 4	3387 A 3	3422 A 3	3462 C 4	3491 C 3	3510 A 2	5378 A 3	5477 C 3	7440 A 1	7506 B 1	

F1



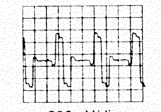
100mV/div
10µs/div

F2



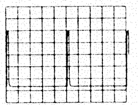
200mV/div
10µs/div

F3



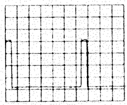
200mV/div
10µs/div

F4



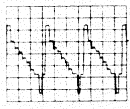
1V/div
2ms/div

F5



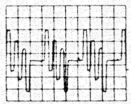
1V/div
5µs/div

F6



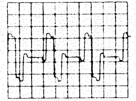
200mV/div
20µs/div

F7



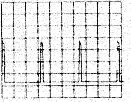
200mV/div
20µs/div

F8



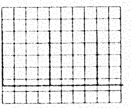
200mV/div
20µs/div

F9



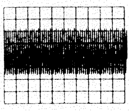
1V/div
20µs/div

F10



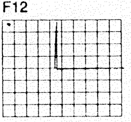
1V/div
5ms/div

F11



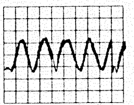
1V/div
0.5µs/div

F12



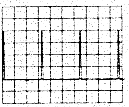
1V/div
50ms/div

F13



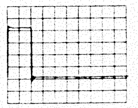
500V/div
50ns/div

F14



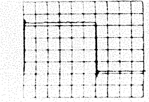
1V/div
20µs/div

F15



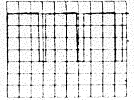
1V/div
0.5µs/div

F16



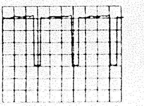
1V/div
0.5µs/div

F17



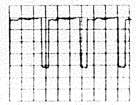
1V/div
20µs/div

F18



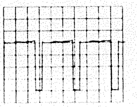
1V/div
10µs/div

F19



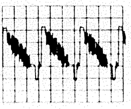
1V/div
10µs/div

F20



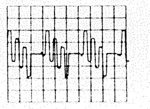
1V/div
10µs/div

F21



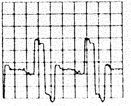
200mV/div
20µs/div

F22



200mV/div
20µs/div

F23



200mV/div
20µs/div

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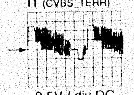
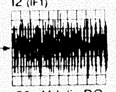
IF module / Zwischenfrequenz-Modul / Module FI

I1 (CVBS_TERR)



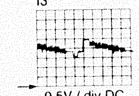
0.5V / div DC
10µs / div

I2 (IF1)



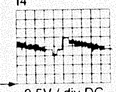
50mV / div DC
50µs / div

I3



0.5V / div DC
10µs / div

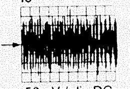
I4



0.5V / div DC
10µs / div

I5
3V DC

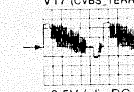
I6



50mV / div DC
50µs / div

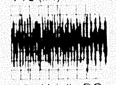
I7 (AGC)
1V9 DC

V17 (CVBS_TERR)



0.5V / div DC
10µs / div

V18 (IF1)

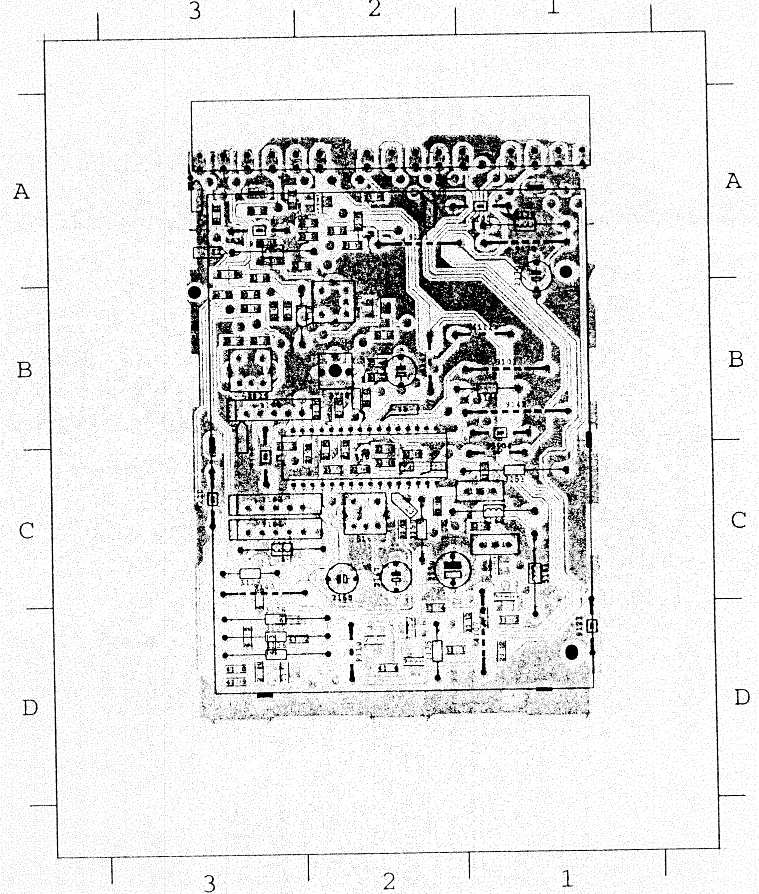


50mV / div DC
50µs / div

→ = 0V

OSC_L.AI
260297

1100 B 3	2105 B 3	2122 D 1	2168 C 2	3121 D 2	3140 B 2	3191 A 2	4114 D 2	5170 A 1	7122 D 2	9104 B 1	N60 A 3
1101 C 3	2109 A 3	2140 C 2	2170 B 1	3122 D 1	3141 B 2	3199 A 2	4122 D 3	6100 A 3	7123 D 3	9105 C 1	
1102 C 3	2110 B 2	2141 B 2	2171 C 2	3124 D 2	3146 B 1	4100 B 3	4142 C 2	6101 A 3	7124 B 2	9106 C 3	
1160 C 1	2111 A 3	2142 B 2	3100 A 2	3125 D 2	3150 C 2	4107 C 1	5100 A 2	6110 C 3	7160 C 1	9110 D 2	
1161 C 1	2112 C 3	2144 B 2	3101 A 2	3126 D 3	3151 C 1	4108 D 1	5101 B 2	6111 D 3	7161 C 1	9120 C 3	
2100 B 2	2115 B 3	2145 C 2	3104 B 3	3127 D 3	3160 C 2	4109 D 3	5102 B 3	6112 D 3	7190 A 2	9121 D 1	
2101 A 2	2116 B 3	2150 C 2	3106 A 3	3128 D 3	3161 C 1	4110 D 3	5110 C 3	7100 B 3	9100 A 1	9140 C 2	
2102 B 3	2117 B 3	2165 C 2	3107 A 2	3129 C 3	3162 D 1	4111 B 1	5160 C 1	7110 C 3	9101 A 1	9141 B 1	
2103 C 2	2120 D 3	2166 C 2	3108 A 2	3130 B 2	3165 C 2	4112 C 1	5161 C 1	7120 D 2	9102 A 3	9142 B 2	
2104 B 3	2121 A 3	2167 C 2	3109 A 3	3131 B 2	3166 C 2	4113 D 3	5165 C 2	7121 D 2	9103 B 1	9170 A 1	

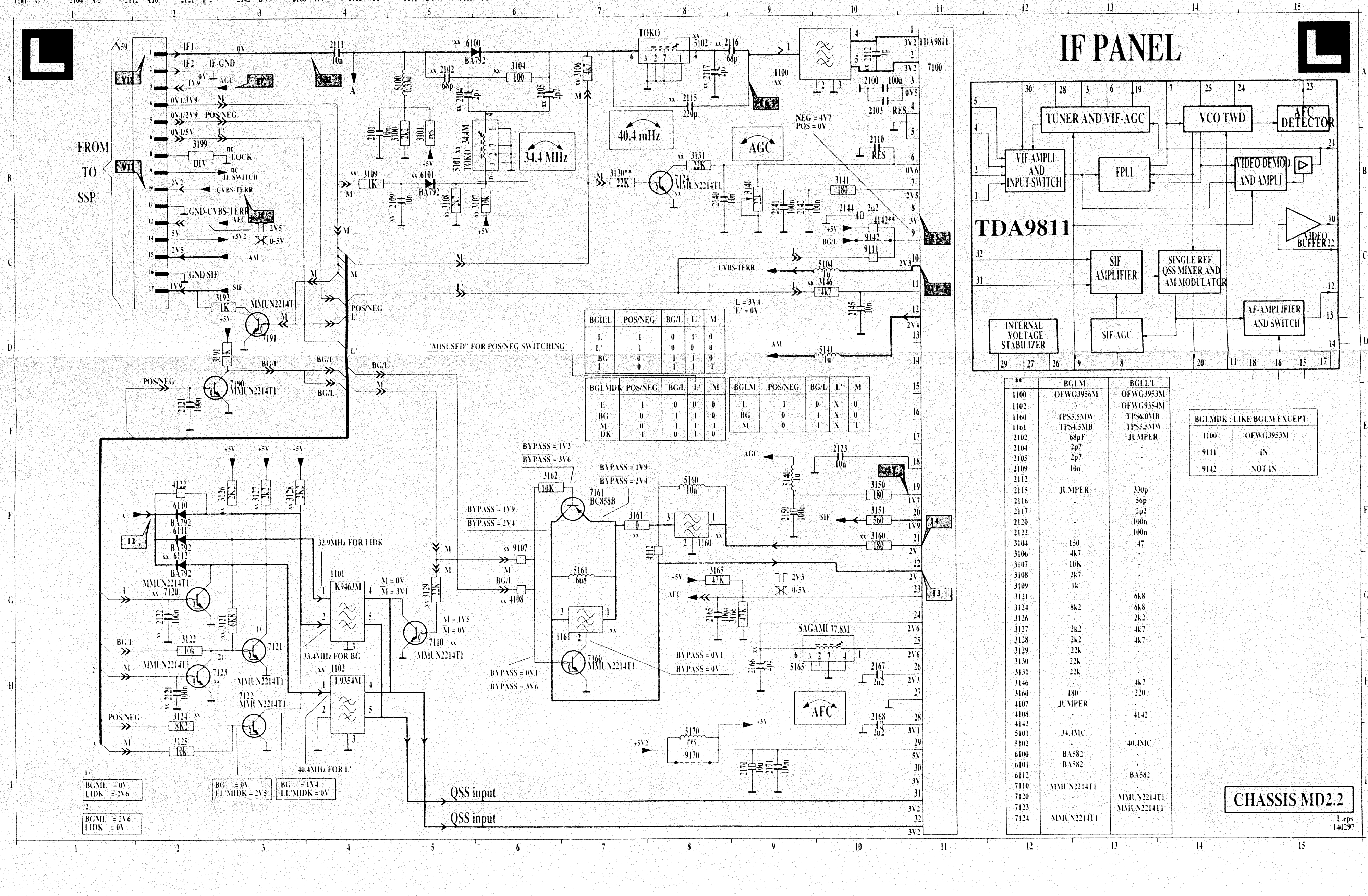


PCS 91 165

IF module / Zwischenfrequenz-Modul / Module FI

MD 2.21/2.22/2.23 **23**

1100 A 9	2100 A10	2105 A 6	2115 A 8	2122 G 2	2144 B10	2167 H10	3101 A 5	3109 B 4	3126 F 3	3131 B 8	3151 F10	3166 G 9	4112 F 8	5102 A 8	5161 G 7	6110 F 2	7120 G 3	7160 H 7	9111 C10
1101 G 4	2101 A 4	2109 B 5	2116 A 9	2123 E10	2145 D10	2168 H10	3104 A 6	3121 G 3	3127 F 3	3140 B 9	3160 F10	3191 D 3	4122 F 2	5104 C10	5165 H 9	6111 F 2	7121 H 3	7161 F 7	9142 C10
1102 H 4	2102 A 5	2110 B10	2117 A 8	2140 B 8	2150 F 9	2170 I 9	3106 A 7	3122 G 2	3128 F 3	3141 B10	3161 F 7	3192 C 3	4142* C10	5140 F 9	5170 I 8	6112 G 2	7122 H 3	7190 D 3	9170 I 8
1160 F 8	2103 A10	2111 A 4	2120 H 2	2141 B 9	2165 G 8	2171 I 9	3107 B 6	3124 H 2	3129 G 5	3146 C10	3162 F 6	3199 B 2	5100 A 5	5141 D10	6100 A 6	7100 A11	7123 H 2	7191 D 3	N59 A 1
1161 G 7	2104 A 5	2112 A10	2121 E 2	2142 B 9	2166 H 9	3100 A 5	3108 B 5	3125 I 2	3130* B 7	3150 F10	3165 G 8	4108 G 6	5101 B 5	5160 F 8	6101 B 5	7110 H 5	7124 B 8	9107 F 6	



IF PANEL
TDA9811
TUNER AND VIF-AGC
VCO TWD
AFC DETECTOR
VIF AMPLI AND INPUT SWITCH
FPLL
VIDEO DEMOD AND AMPLI
VIDEO BUFFER
SIF AMPLIFIER
SINGLE REF QSS MIXER AND AM MODULATOR
AF-AMPLIFIER AND SWITCH
INTERNAL VOLTAGE STABILIZER
SIF-AGC
FROM
TO
SSP
N59
IF1
IF2
IF-GND
AGC
POS/NEG
LOCK
IF-SWITCH
CVBS-TERR
GND-CVBS-TERR
GND SIF
SIF
AM
TOKO
34.4 MHz
40.4 mHz
AGC
AFC
SAGAMI 27.8M
NEG = 4V7
POS = 0V
L = 3V4
L' = 0V
"MISUSED" FOR POS/NEG SWITCHING
BYPASS = 1V3
BYPASS = 3V6
BYPASS = 1V9
BYPASS = 2V4
BYPASS = 0V1
BYPASS = 0V
BYPASS = 3V6
M = 0V
M = 3V1
M = 1V5
32.9MHz FOR LIDK
33.4MHz FOR BG
40.4MHz FOR L'
QSS input
QSS input
1) BGML' = 0V LIDK = 2V6
2) BGML' = 2V6 LIDK = 0V
BG = 0V L'L'MDK = 2V5
BG = 1V4 L'L'MDK = 0V

BGILL'	POS/NEG	BG/L	L'	M
L	1	0	1	0
L'	1	0	0	0
BG	0	1	1	0
I	0	1	1	1

BGLMDK	POS/NEG	BG/L	L'	M
L	1	0	0	0
BG	0	1	1	0
M	0	1	1	1
DK	1	0	1	0

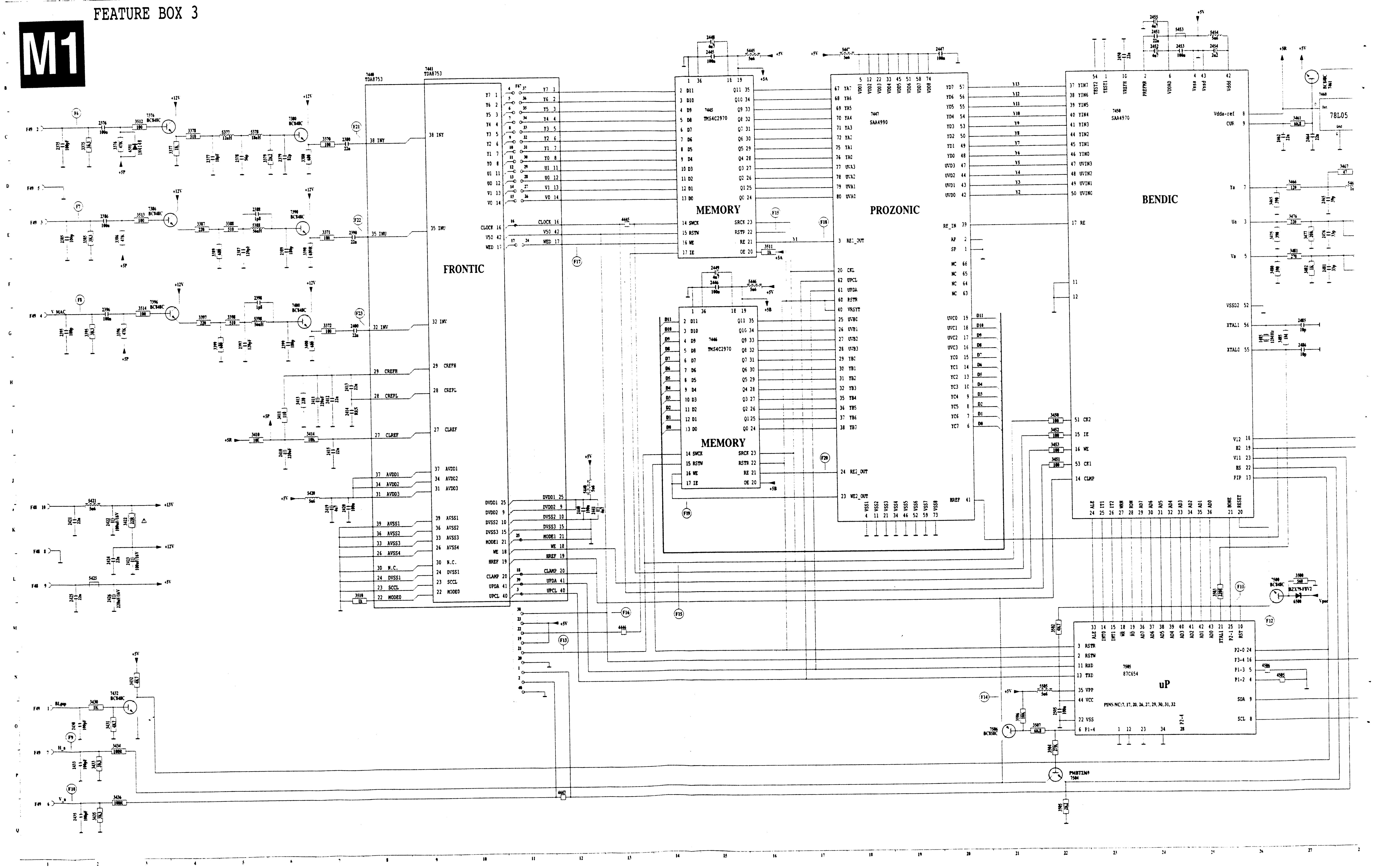
BGLM	POS/NEG	BG/L	L'	M
L	1	0	X	0
BG	0	1	X	0
M	0	1	X	1

**	BGLM	BGLL'I
1100	OFWG3956M	OFWG3953M
1102	-	OFWG9354M
1160	TPS5,5MW	TPS6,0MB
1161	TPS4,5MB	TPS5,5MW
2102	68pF	JUMPER
2104	2p7	-
2105	2p7	-
2109	10n	-
2112	-	
2115	JUMPER	330p
2116	-	56p
2117	-	2p2
2120	-	100n
2122	-	100n
3104	150	47
3106	4k7	-
3107	10K	-
3108	2k7	-
3109	1k	-
3121	-	6k8
3124	8k2	6k8
3126	-	2k2
3127	2k2	4k7
3128	2k2	4k7
3129	22k	-
3130	22k	-
3131	22k	-
3146	-	4k7
3160	180	220
4107	JUMPER	-
4108	-	4142
4142	-	-
5101	34,4MC	-
5102	-	40.4MC
6100	BA582	-
6101	BA582	-
6112	-	BA582
7110	MMUN2214T1	-
7120	-	MMUN2214T1
7123	-	MMUN2214T1
7124	MMUN2214T1	-

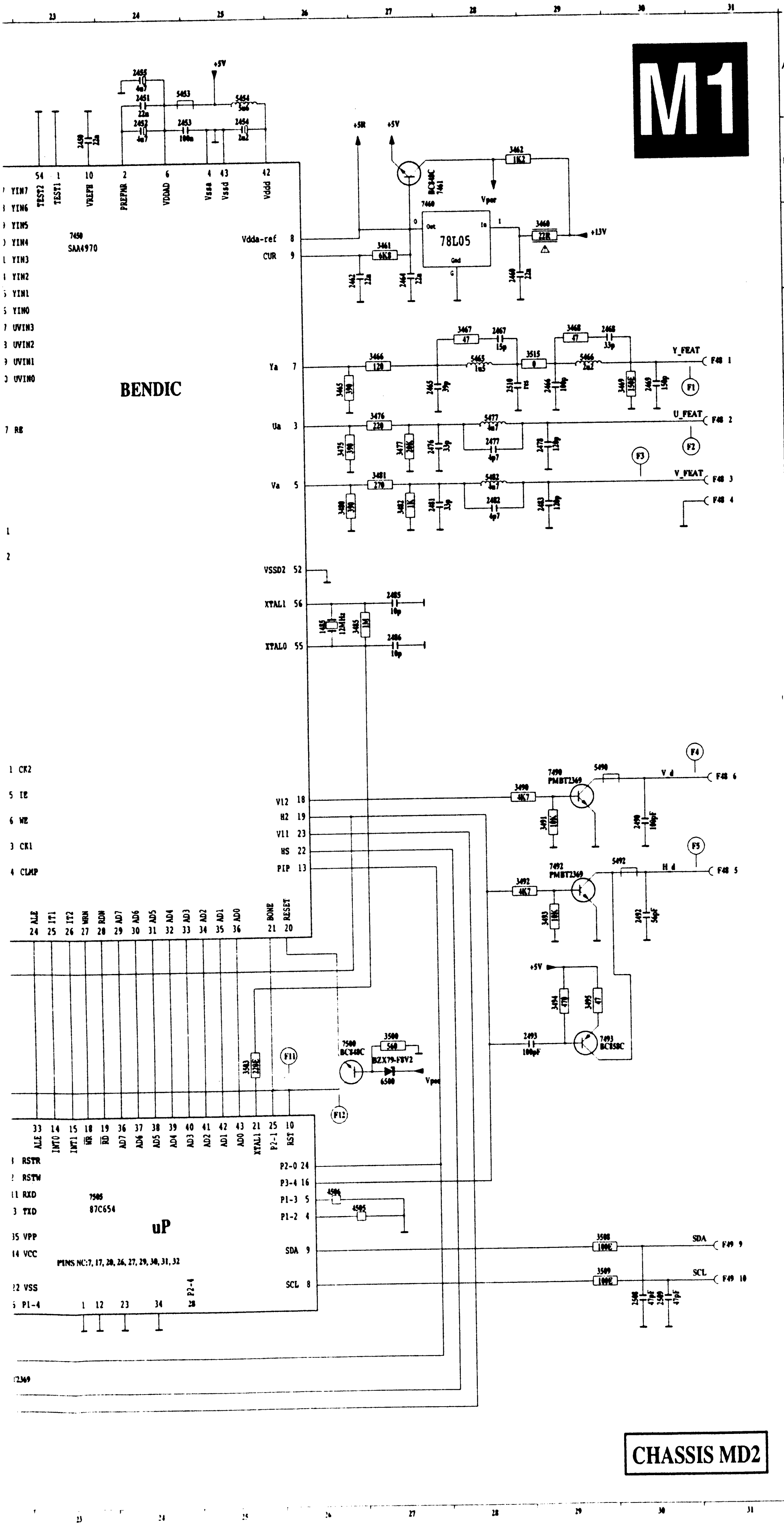
BGLMDK ; LIKE BGLM EXCEPT:	
1100	OFWG3953M
9111	IN
9142	NOT IN

CHASSIS MD2.2

L.eps
140297


FEATURE BOX 3
M1
7440 TDA8753
7441 TDA8753
FRONTIC
7445 TMS4C2970
MEMORY
7446 TMS4C2970
MEMORY
7447 SAA4990
PROZONIC
7450 SAA4970
BENDIC
7460 78L05
7505 87C654
uP
PINS NC:7, 17, 20, 26, 27, 29, 30, 31, 32
7376 BC848C
7380 BC848C
7386 BC848C
7390 BC848C
7396 BC848C
7400 BC848C
7432 BC848C
7500 BC848C
7504 PMBT2369
7506 BC858C
7461 BC848C
BZX79-F8V2
+12V
+13V
+5V
Vpor
F49
F48

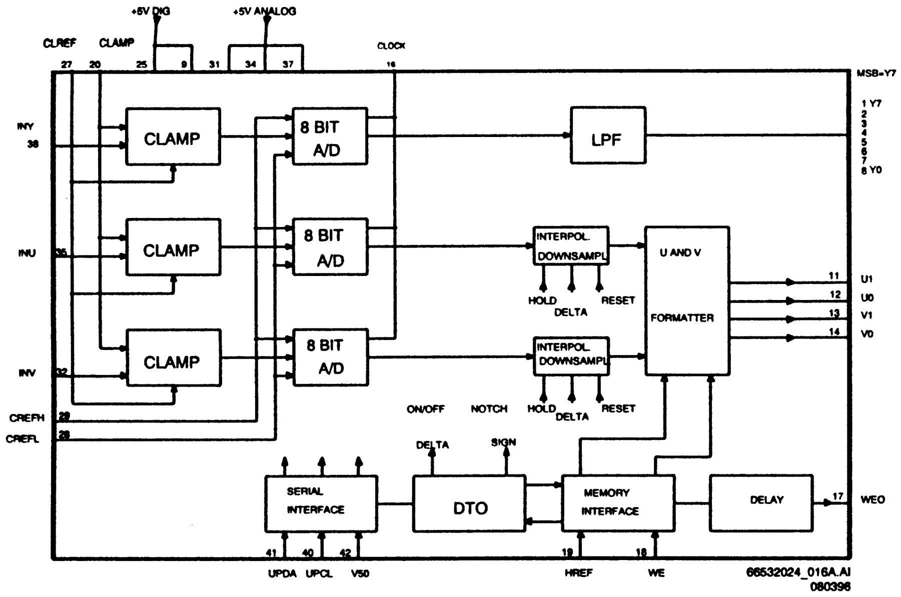
Platine Boîtier Numérique (balayage numérique)


M1
BENDIC
7450
SAA4970
78L05
7460
7461
BC848C
Vpor
+5R
+5V
+13V
Vdda-ref
CUR
Ya
Ua
Va
Y_FEAT
U_FEAT
V_FEAT
F48 1
F48 2
F48 3
F48 4
F48 5
F48 6
F1
F2
F3
F4
F5
F11
F12
VSSD2
XTAL1
XTAL0
12MHz
V12
H2
V11
HS
PIP
7490
PMBT2369
7492
PMBT2369
7493
BC858C
7500
BC848C
BZX79-F8V2
6500
V d
H d
7505
87C654
uP
PINS NC:7, 17, 20, 26, 27, 29, 30, 31, 32
SDA
SCL
F49 9
F49 10
TEST2
TEST1
VREFH
PREPMR
VDDAD
Vssa
Vssd
Vddd
YIN7
YIN6
YIN5
YIN4
YIN3
YIN2
YIN1
YIN0
UVIN3
UVIN2
UVIN1
UVIN0
RE
CK2
IE
WE
CK1
CLMP
ALE
IT1
IT2
WRN
RDN
AD7
AD6
AD5
AD4
AD3
AD2
AD1
AD0
BONE
RESET
INT0
INT1
WR
RD
XTAL1
P2-1
RST
RSTR
RSTW
RXD
TXD
VPP
VCC
VSS
P1-4
P2-0
P3-4
P1-3
P1-2
P2-4
CHASSIS MD2

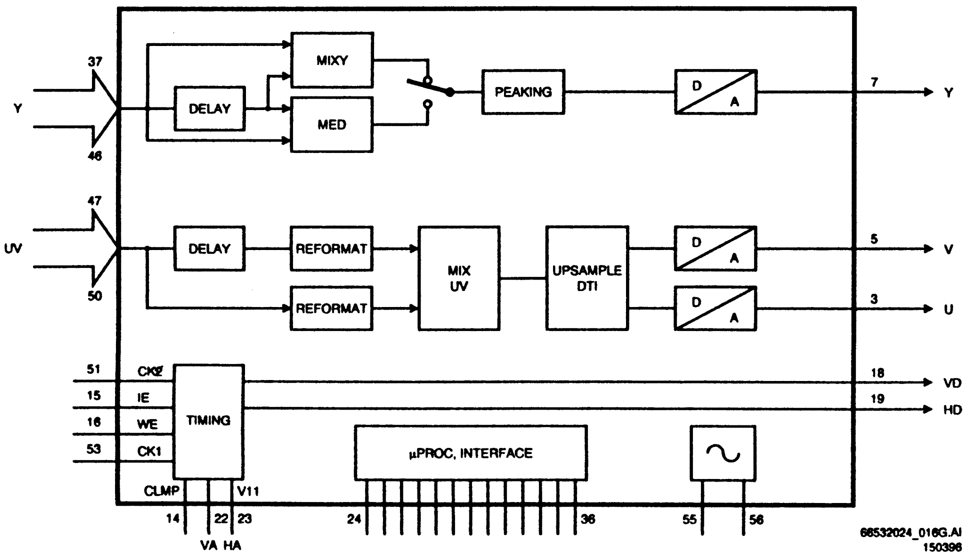
1485	G26
2375	C 1
2376	C 2
2377	C 5
2378	C 5
2379	C 6
2380	C 7
2385	E 1
2386	E 2
2387	E 5
2388	E 6
2389	E 6
2390	E 8
2395	G 1
2396	G 2
2397	G 5
2398	F 6
2399	G 6
2400	G 8
2410	I 6
2411	H 7
2412	H 7
2413	H 7
2414	I 7
2415	I 7
2419	K 7
2420	K 7
2421	K 2
2422	K 2
2423	L 3
2424	L 2
2425	L 2
2426	L 2
2430	O 2
2433	P 2
2435	Q 2
2440	K12
2441	K12
2445	A15
2446	F15
2447	A20
2448	A15
2449	F15
2450	B23
2451	A24
2452	A24
2453	A25
2454	A25
2455	A24
2460	C28
2462	C27
2464	C27
2465	E27
2466	E29
2467	D28
2468	D30
2469	E30
2476	E27
2477	E28
2478	E29
2481	F27
2482	F28
2483	F29
2485	G27
2486	H27
2490	J30
2492	K30
2493	L29
2505	O22
2508	O30
2509	O30
2510	E28
3370	C 7
3371	E 7
3372	G 7
3375	C 2
3376	C 3
3377	C 4
3378	C 4
3379	C 6
3380	C 7
3385	E 2
3386	E 3
3387	E 4
3388	E 5
3389	E 5
3390	E 7
3395	G 2
3396	G 3
3397	G 4
3398	G 5
3399	G 5
3400	G 7
3410	I 5
3411	I 6
3413	H 6
3414	I 7
3422	K 3
3430	O 2
3431	O 2
3432	N 3
3433	P 2
3434	O 2
3435	Q 2
3436	Q 2
3450	I22
3451	J22
3452	I22
3453	J22
3460	C29
3461	C27
3462	B29
3465	E26
3466	D27
3467	D28
3468	D29
3469	E30
3475	E26
3476	E27
3477	E27
3480	F26
3481	F27
3482	F27
3485	G27
3490	I28
3491	J29
3492	J28
3493	K29
3494	L29
3495	L29
3500	L27
3502	M22
3503	M25
3504	P22
3505	Q22
3506	O21
3507	O21
3508	O29
3509	O29
3510	L 8
3511	E16
3512	C 3
3513	E 3
3514	G 3
3515	D29
3998	M 5
3999	N 5
4445	E13
4446	M13
4447	Q12
4505	N26
4506	N26
5377	C 5
5378	C 6
5388	E 6
5398	G 6
5420	J 7
5421	J 2
5425	L 2
5440	J12
5445	A16
5446	F16
5447	A18
5453	A25
5454	A25
5465	D28
5466	D29
5477	E28
5482	F28
5490	I29
5492	J30
5505	N22
6500	M27
6501	C 3
7376	C 3
7380	C 6
7386	E 3
7390	E 6
7396	F 3
7400	G 6
7432	N 2
7440	B 8
7441	B 9
7445	C15
7446	G15
7447	C18
7450	C23
7460	B27
7461	B28
7490	I29
7492	J29
7493	L29
7500	L26
7504	P22
7505	N23
7506	O21
F48	D31
F48	E31
F48	F31
F48	F31
F48	J31
F48	I31
F48	K 1
F48	L 1
F48	K 1
F49	O 1
F49	C 1
F49	E 1
F49	G 1
F49	D 1
F49	Q 1
F49	P 1
F49	O31
F49	O31
F67	B11

Diagrammes synoptiques des CI dans les boîtes de fonctions

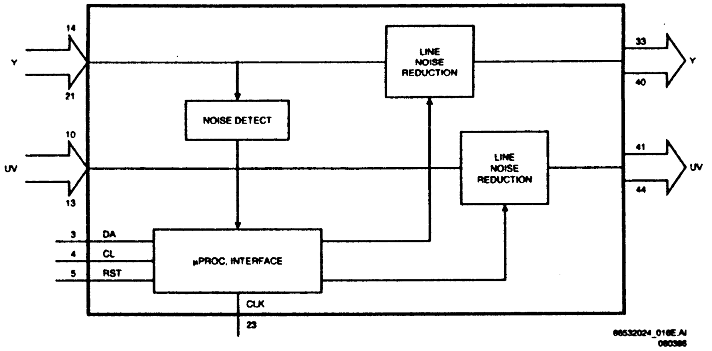
FRONTIC TDA 8753 (IC 7440/7441 in both feature boxes) M1 / M2


+5V DIG
+5V ANALOG
CLREF
CLAMP
27
20
25
9
31
34
37
CLOCK
16
MSB=Y7
INY
36
INU
35
INV
32
CREFH
29
CREFL
28
CLAMP
CLAMP
CLAMP
8 BIT A/D
8 BIT A/D
8 BIT A/D
LPF
1 Y7
2
3
4
5
6
7
8 Y0
INTERPOL. DOWNSAMPL
INTERPOL. DOWNSAMPL
HOLD
DELTA
RESET
HOLD
DELTA
RESET
U AND V FORMATTER
11
12
13
14
U1
U0
V1
V0
ON/OFF
NOTCH
DELTA
SIGN
SERIAL INTERFACE
DTO
MEMORY INTERFACE
DELAY
17
WEO
41
40
42
UPDA
UPCL
V50
19
18
HREF
WE
66532024_016A.AI
080396

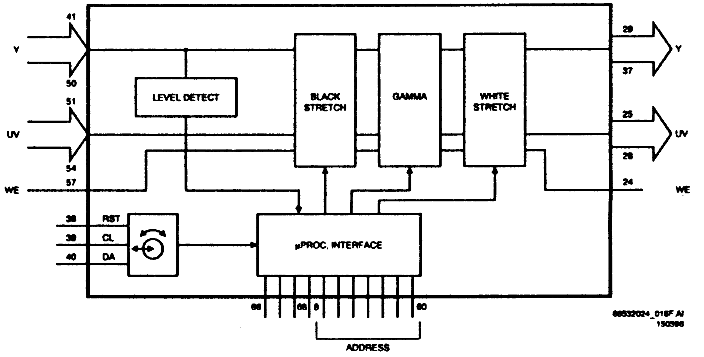
BENDIC SAA 4970 (IC 7450 in both feature boxes) M1 / M2


37
Y
46
DELAY
MIXY
MED
PEAKING
D
A
7
Y
47
UV
50
DELAY
REFORMAT
REFORMAT
MIX UV
UPSAMPLE DTI
D
A
D
A
5
V
3
U
51
CK2
15
IE
16
WE
53
CK1
TIMING
CLMP
V11
14
22
23
VA HA
18
VD
19
HD
µPROC. INTERFACE
24
36
55
56
66532024_016G.AI
150396

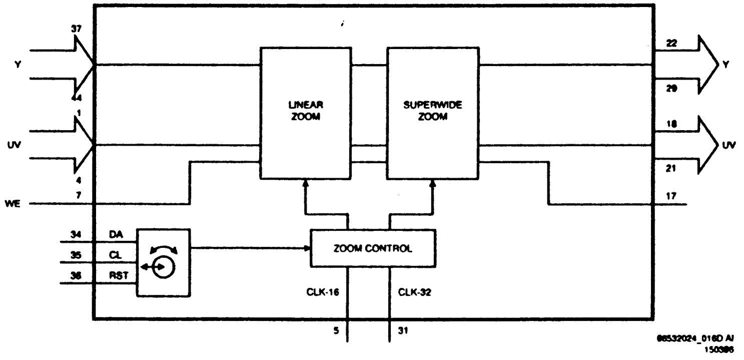
LIMERIC QFP44 (IC7005 on AI panel) N


14
Y
21
10
UV
13
NOISE DETECT
LINE NOISE REDUCTION
LINE NOISE REDUCTION
33
Y
40
41
UV
44
3
DA
4
CL
5
RST
µPROC. INTERFACE
CLK
23
66532024_016E.AI
080396

SMARTIC QFP80 (IC7008 on AI panel) N

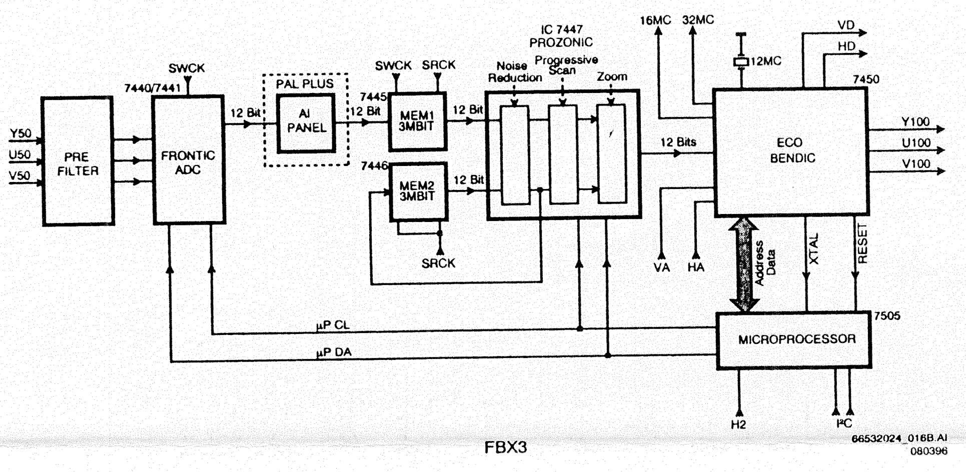

41
Y
50
51
UV
54
57
WE
LEVEL DETECT
BLACK STRETCH
GAMMA
WHITE STRETCH
29
Y
37
25
UV
28
24
WE
38
RST
39
CL
40
DA
µPROC. INTERFACE
66
68
8
60
ADDRESS
66532024_016F.AI
150396

PANIC PLC44 (IC7010 on AI panel) N

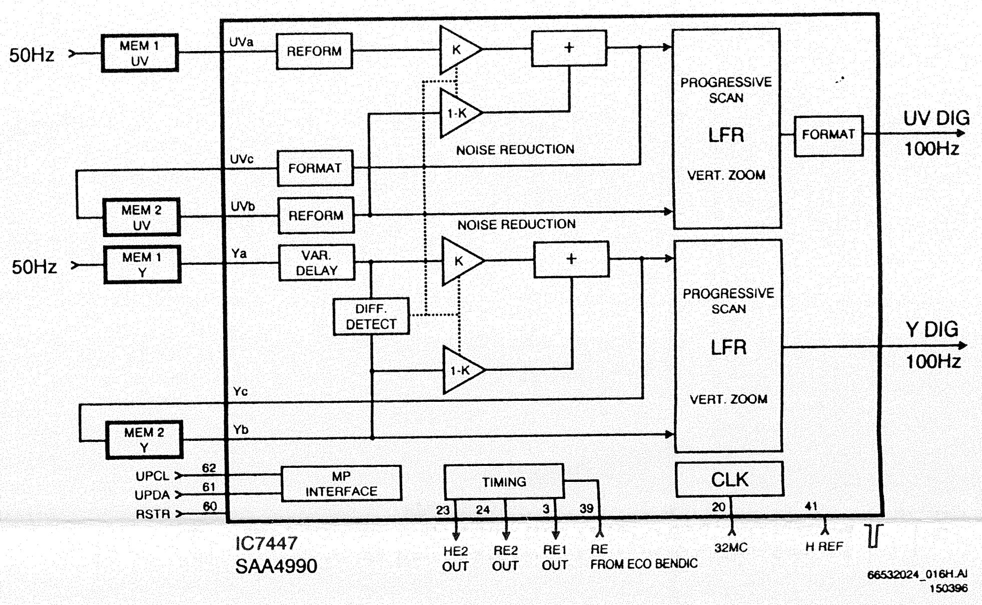

37
Y
44
1
UV
4
7
WE
LINEAR ZOOM
SUPERWIDE ZOOM
22
Y
29
18
UV
21
17
34
DA
35
CL
36
RST
ZOOM CONTROL
CLK-16
CLK-32
5
31
66532024_016D.AI
150396

Block diagrams of IC's in Feature Boxes / Schaltbilder der ICs in den Feature-Boxen /

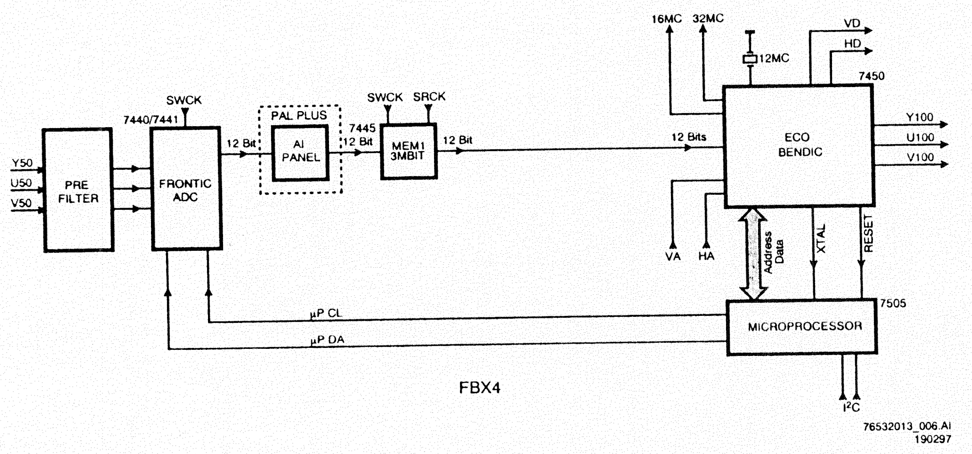
Feature box 3 (digital scan) **M1**


Y50
U50
V50
PRE FILTER
SWCK
7440/7441
FRONTIC ADC
12 Bit
PAL PLUS
AI PANEL
7445
12 Bit
SWCK
SRCK
MEM1 3MBIT
7446
MEM2 3MBIT
12 Bit
SRCK
IC 7447 PROZONIC
Noise Reduction
Progressive Scan
Zoom
16MC
32MC
12MC
VD
HD
7450
12 Bits
ECO BENDIC
Y100
U100
V100
VA
HA
Address Data
XTAL
RESET
7505
MICROPROCESSOR
µP CL
µP DA
H2
I²C
FBX3
66532024_016B.AI
080396

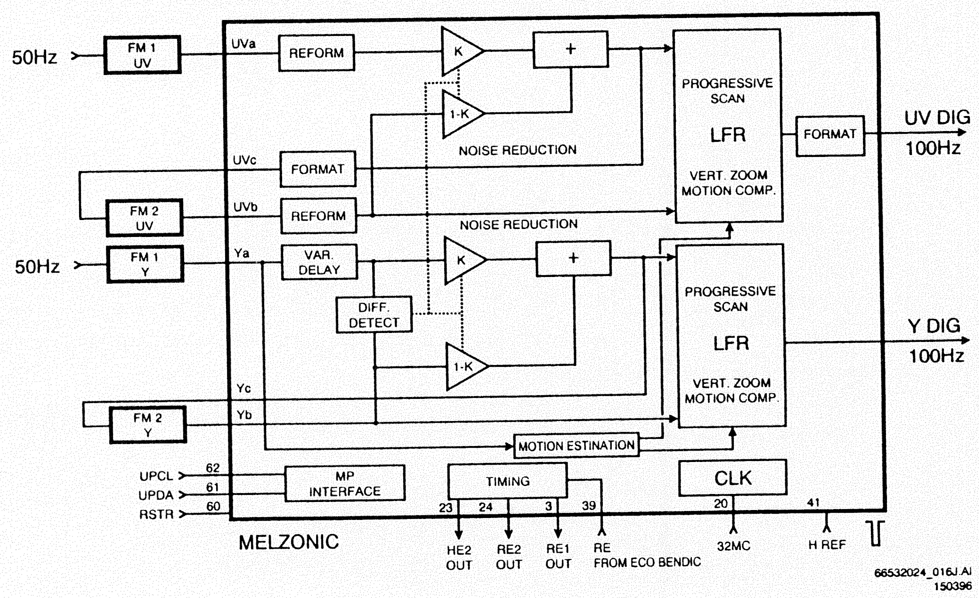
Prozinic SAA 4990 (IC7447 Feature box digital scan) **M1**


50Hz
MEM 1 UV
UVa
REFORM
K
+
1-K
NOISE REDUCTION
PROGRESSIVE SCAN
LFR
VERT. ZOOM
FORMAT
UV DIG
100Hz
UVc
FORMAT
MEM 2 UV
UVb
REFORM
NOISE REDUCTION
50Hz
MEM 1 Y
Ya
VAR. DELAY
DIFF. DETECT
Y DIG
100Hz
Yc
MEM 2 Y
Yb
UPCL
UPDA
RSTR
62
61
60
MP INTERFACE
TIMING
CLK
23
24
3
39
20
41
HE2 OUT
RE2 OUT
RE1 OUT
RE FROM ECO BENDIC
32MC
H REF
IC7447
SAA4990
66532024_016H.AI
150396

Feature box 4 (ECO) **M2**

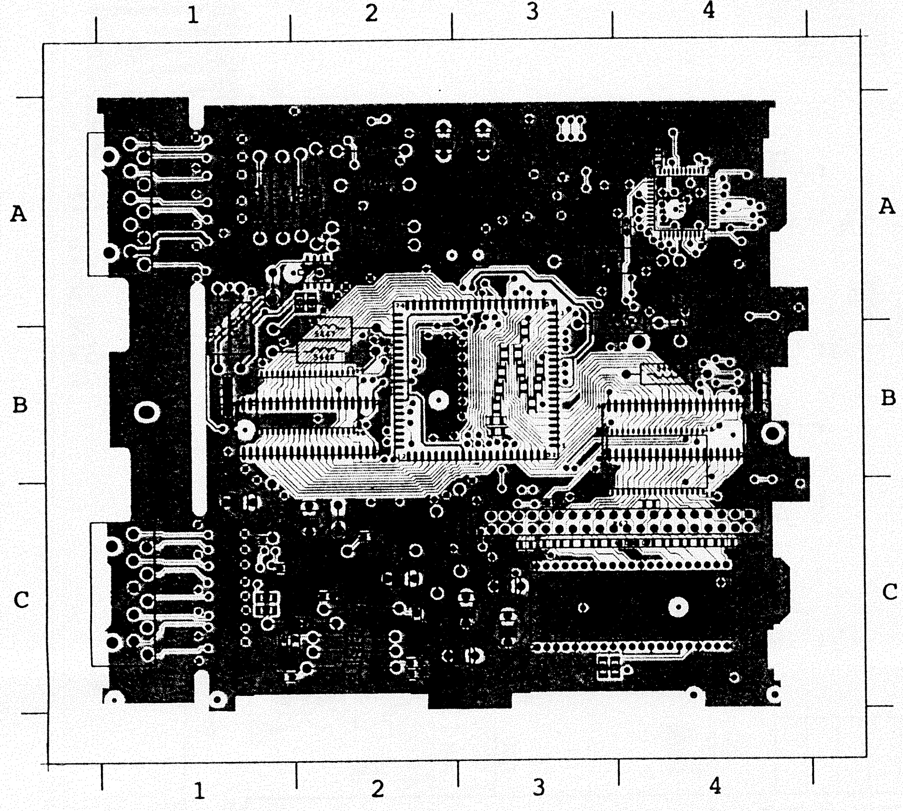

Y50
U50
V50
PRE FILTER
SWCK
7440/7441
FRONTIC ADC
12 Bit
PAL PLUS
AI PANEL
7445
12 Bit
SWCK
SRCK
MEM1 3MBIT
12 Bit
16MC
32MC
12MC
VD
HD
7450
12 Bits
ECO BENDIC
Y100
U100
V100
VA
HA
Address Data
XTAL
RESET
7505
MICROPROCESSOR
µP CL
µP DA
I²C
FBX4
76532013_006.AI
190297

MELZONIC SAA 4991 (IC 7447 Feature box natural motion) **M1**

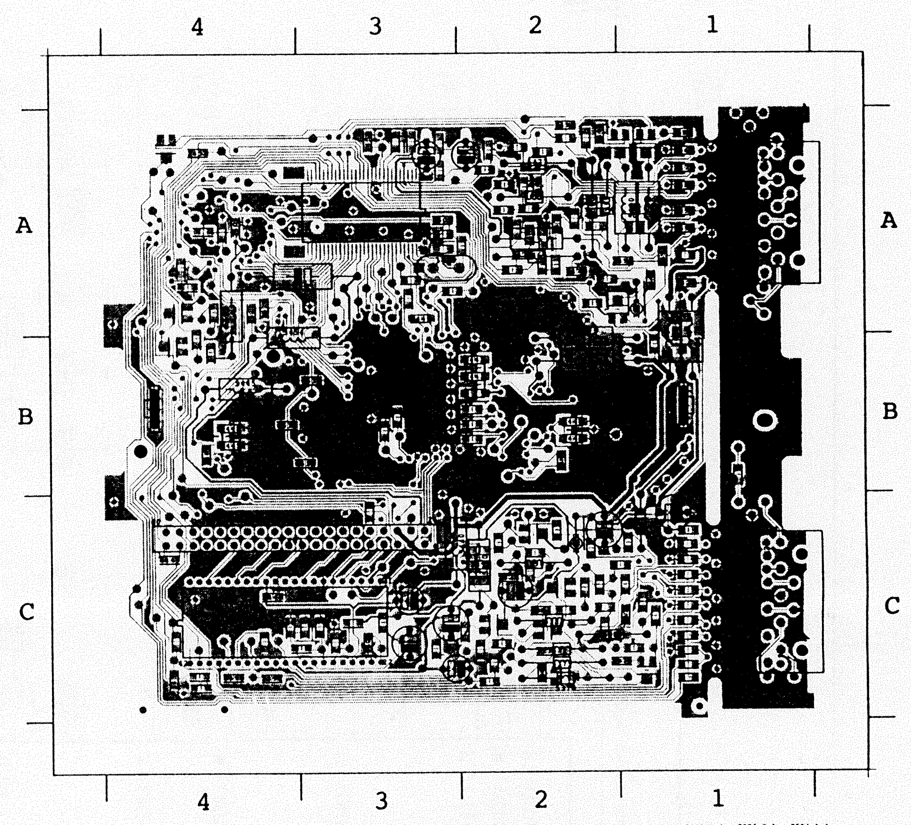

50Hz
FM 1 UV
UVa
REFORM
K
+
1-K
NOISE REDUCTION
PROGRESSIVE SCAN
LFR
VERT. ZOOM MOTION COMP.
FORMAT
UV DIG
100Hz
UVc
FORMAT
FM 2 UV
UVb
REFORM
NOISE REDUCTION
50Hz
FM 1 Y
Ya
VAR. DELAY
DIFF. DETECT
Y DIG
100Hz
Yc
FM 2 Y
Yb
MOTION ESTINATION
UPCL
UPDA
RSTR
62
61
60
MP INTERFACE
TIMING
CLK
23
24
3
39
20
41
HE2 OUT
RE2 OUT
RE1 OUT
RE FROM ECO BENDIC
32MC
H REF
MELZONIC
66532024_016J.AI
150396

PCS 91 168

Feature Box (natural motion) panel / Feature-Box-Platine (Natürliche Bewegung) / Platine Boîtier Numérique (mouvement natural)

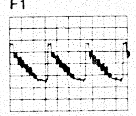


1485 A 3	2381 C 3	2422 C 1	3374 C 1	3447 A 2	4406 C 4	4413 C 3	4457 B 3	4507 A 4	5398 C 2	5447 B 1	5490 A 1	7444 B 2	F49 C 1
2373 C 1	2387 C 2	2423 C 2	3379 C 2	3460 A 1	4407 C 4	4451 B 3	4458 B 3	4508 C 3	5420 C 2	5453 A 2	5492 A 1	7445 B 4	F67 C 4
2374 C 1	2389 C 2	2426 C 2	3385 C 1	4401 C 4	4408 C 4	4452 B 3	4459 B 3	4509 A 4	5421 A 1	5454 B 4	5505 B 4	7446 B 2	mec1 B 4
2377 C 2	2397 C 2	2441 C 3	3395 C 1	4402 C 4	4409 C 3	4453 B 3	4460 B 3	5377 C 2	5425 A 1	5465 A 2	6367 C 2	7447 B 3	mec2 B 1
2378 C 1	2410 C 3	2452 A 2	3410 C 1	4403 C 4	4410 C 3	4454 B 3	4461 B 3	5378 C 2	5440 C 3	5466 A 2	6500 A 2	7460 A 2	
2379 C 2	2411 C 3	2454 A 3	3422 C 2	4404 C 4	4411 C 3	4455 B 3	4462 B 3	5379 C 2	5445 B 4	5477 A 2	7440 C 4	7505 A 4	
2380 C 3	2419 C 3	2455 A 3	3446 A 2	4405 C 4	4412 C 3	4456 B 3	4463 B 3	5388 C 2	5446 B 1	5482 A 2	7443 B 4	F48 A 1	



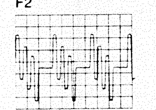
1485 A 3	2412 C 3	2435 C 1	2454 A 3	2478 A 1	3377 C 1	3393 C 2	3430 C 1	3449 B 2	3471 A 2	3499 B 1	4505 A 4	5445 B 4	7376 C 1	7504 A 4
2375 C 1	2413 C 3	2440 C 4	2455 A 3	2481 A 2	3378 C 1	3396 C 1	3431 A 1	3450 A 3	3475 A 2	3500 A 2	4506 A 4	5446 B 1	7380 C 2	7506 B 4
2376 C 2	2414 C 3	2441 C 3	2460 A 2	2482 A 2	3380 C 2	3397 C 2	3432 B 1	3451 A 3	3476 A 2	3502 A 4	4510 B 3	5447 B 1	7386 C 2	F48 A 1
2385 C 1	2415 C 3	2442 B 2	2462 A 3	2483 A 1	3381 C 2	3398 C 2	3433 C 4	3452 A 4	3477 A 2	3503 A 3	4511 B 4	5453 A 2	7390 C 2	F49 C 1
2386 C 1	2419 C 3	2443 B 2	2464 A 3	2485 A 3	3382 C 1	3399 C 2	3434 C 4	3453 A 3	3480 A 2	3504 A 4	4512 B 3	5454 B 4	7396 C 2	F67 C 4
2388 C 2	2420 C 4	2444 B 2	2465 A 2	2486 A 3	3383 C 2	3400 C 2	3435 C 4	3460 A 1	3481 A 2	3505 A 4	5377 C 2	5465 A 2	7400 C 2	mec1 B 4
2390 C 4	2421 A 1	2445 B 4	2466 A 2	2490 A 1	3384 C 2	3401 C 2	3436 C 4	3461 A 2	3482 A 2	3506 B 4	5378 C 2	5466 A 2	7432 B 1	mec2 B 1
2395 C 1	2422 C 1	2446 B 2	2467 A 2	2492 A 1	3386 C 1	3402 C 2	3440 B 3	3462 A 1	3485 A 2	3507 B 4	5379 C 2	5477 A 2	7440 C 4	
2396 C 2	2423 C 2	2447 B 2	2468 A 2	2493 A 2	3387 C 2	3410 C 1	3441 B 3	3465 A 2	3490 A 2	3508 C 1	5388 C 2	5482 A 2	7450 A 3	
2398 C 2	2424 C 2	2448 B 4	2469 A 1	2505 A 4	3388 C 2	3411 C 3	3442 B 2	3466 A 2	3491 A 2	3509 C 1	5398 C 2	5490 A 1	7461 A 1	
2399 C 2	2425 A 1	2450 A 3	2470 A 2	2508 C 1	3389 C 2	3413 C 4	3443 B 2	3467 A 2	3492 A 2	3510 A 4	5420 C 2	5492 A 1	7490 A 1	
2400 C 3	2426 C 2	2451 A 3	2471 A 2	2509 C 1	3390 C 2	3414 C 3	3444 B 2	3468 A 2	3493 A 1	3511 A 4	5421 A 1	5505 B 4	7492 A 1	
2410 C 3	2430 C 1	2452 A 2	2476 A 2	3375 C 1	3391 C 4	3420 C 3	3445 B 4	3469 A 2	3494 A 1	4445 C 3	5425 A 1	6367 C 2	7493 A 1	
2411 C 3	2433 C 1	2453 A 3	2477 A 2	3376 C 1	3392 C 2	3422 C 2	3448 A 3	3470 A 2	3495 A 1	4447 C 4	5440 C 3	6500 A 2	7500 A 4	

F1



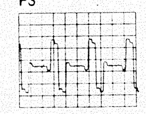
100mV/div
10µs/div

F2



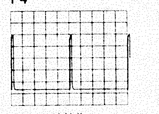
200mV/div
10µs/div

F3



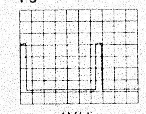
200mV/div
10µs/div

F4



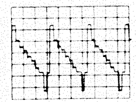
1V/div
2ms/div

F5



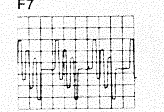
1V/div
5µs/div

F6



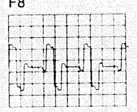
200mV/div
20µs/div

F7



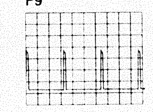
200mV/div
20µs/div

F8



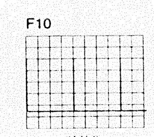
200mV/div
20µs/div

F9



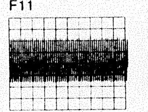
1V/div
20µs/div

F10



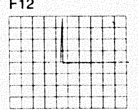
1V/div
5ms/div

F11



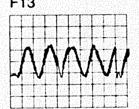
1V/div
0.5µs/div

F12



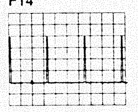
1V/div
50ms/div

F13



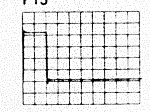
500V/div
50ns/div

F14



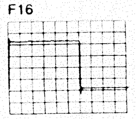
1V/div
20µs/div

F15



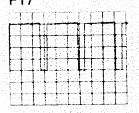
1V/div
0.5µs/div

F16



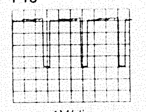
1V/div
0.5µs/div

F17



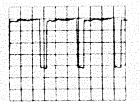
1V/div
20µs/div

F18



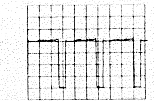
1V/div
10µs/div

F19



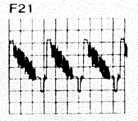
1V/div
10µs/div

F20



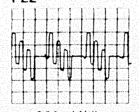
1V/div
10µs/div

F21



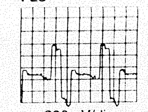
200mV/div
20µs/div

F22



200mV/div
20µs/div

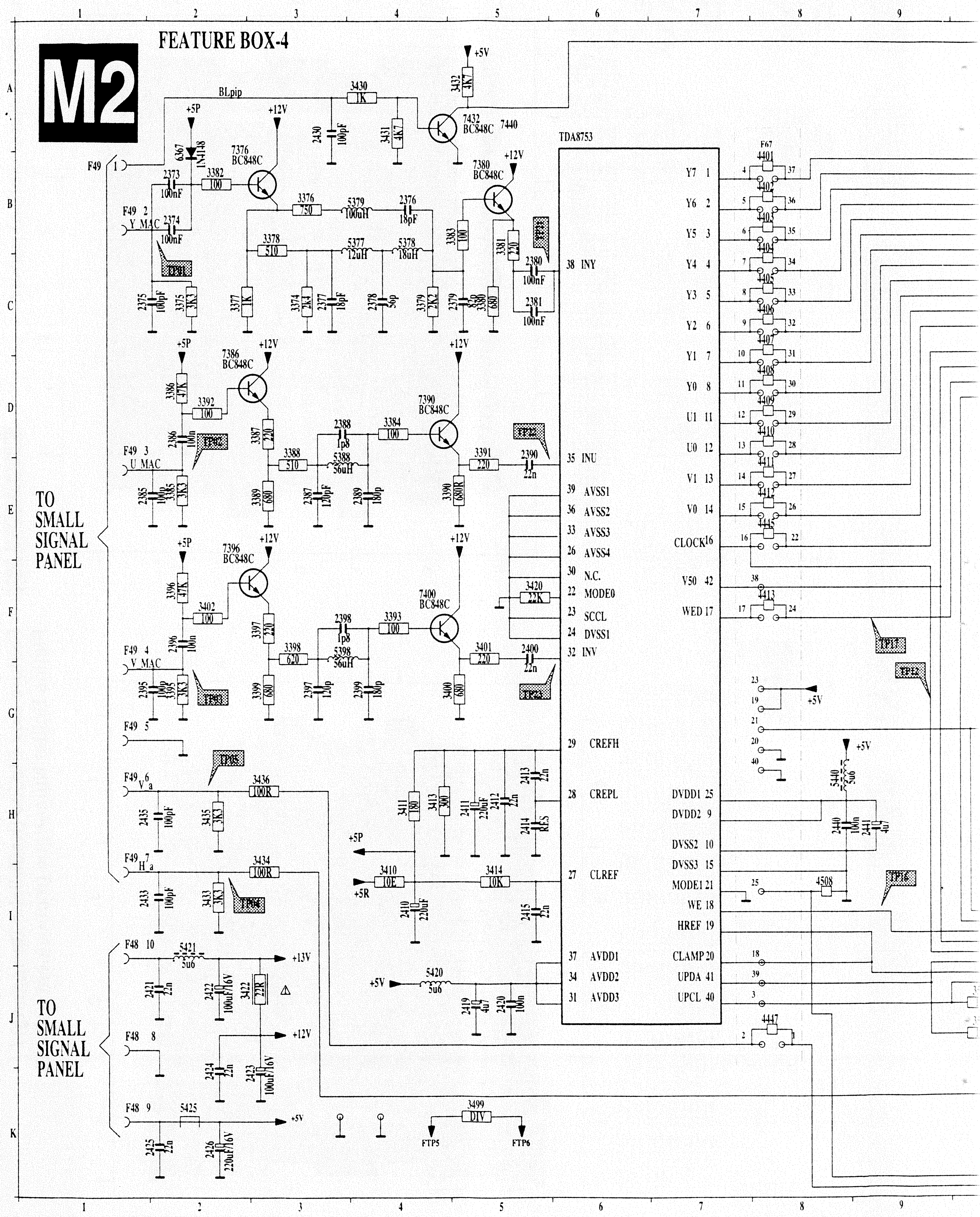
F23



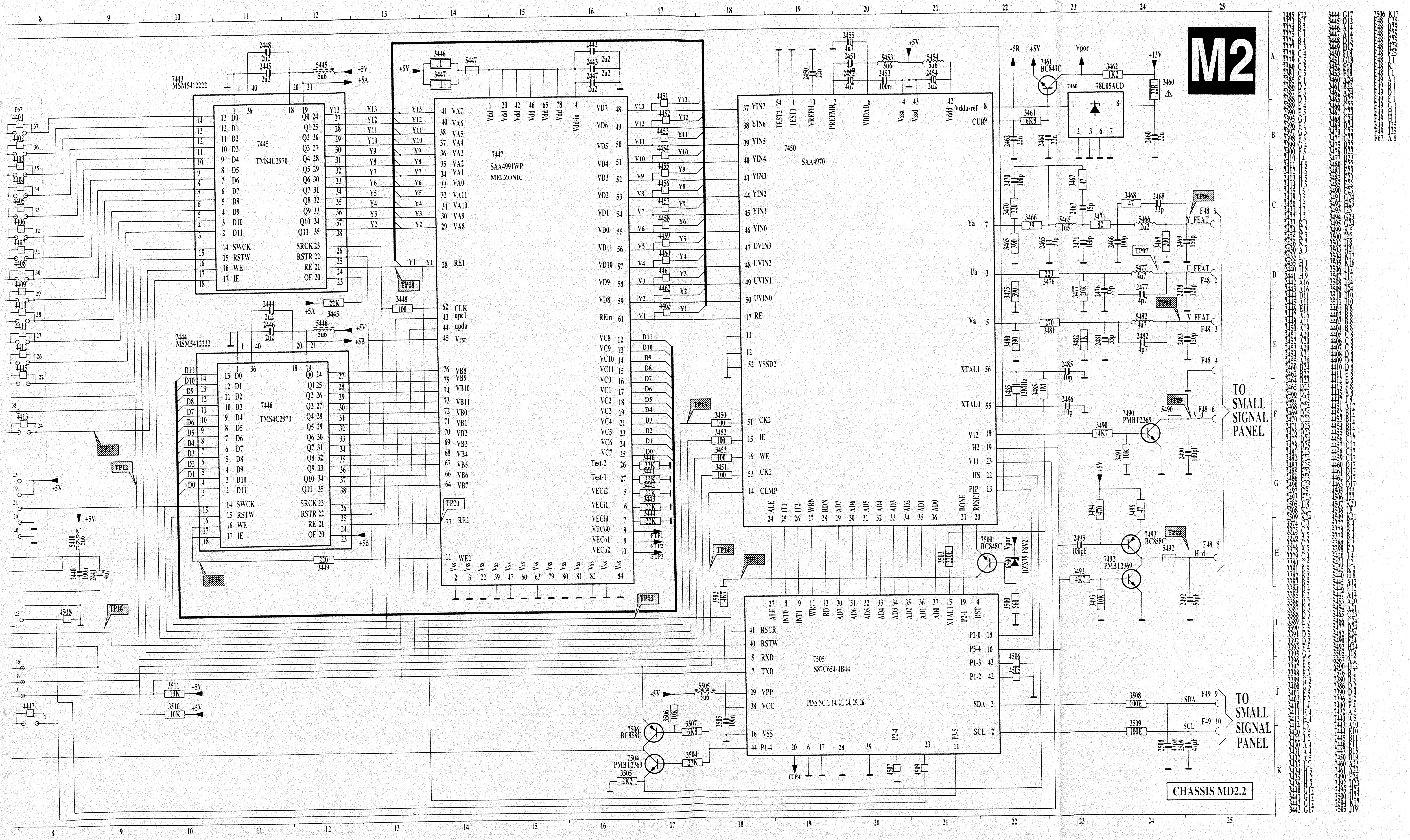
200mV/div
20µs/div

PCS 91 170

Feature Box (natural motion) panel /


M2
FEATURE BOX-4
TDA8753
TO SMALL SIGNAL PANEL
TO SMALL SIGNAL PANEL
F49
F48
BLpip
Y_MAC
U_MAC
V_MAC
V_a
H_a
+5V
+5P
+12V
+13V
+5R
38 INY
35 INU
32 INV
39 AVSS1
36 AVSS2
33 AVSS3
26 AVSS4
30 N.C.
22 MODE0
23 SCCL
24 DVSS1
29 CREFH
28 CREPL
27 CLREF
37 AVDD1
34 AVDD2
31 AVDD3
Y7 1
Y6 2
Y5 3
Y4 4
Y3 5
Y2 6
Y1 7
Y0 8
U1 11
U0 12
V1 13
V0 14
CLOCK16
V50 42
WED 17
DVDD1 25
DVDD2 9
DVSS2 10
DVSS3 15
MODE1 21
WE 18
HREF 19
CLAMP 20
UPDA 41
UPCL 40
7432 BC848C
7440
7376 BC848C
7380 BC848C
7386 BC848C
7390 BC848C
7396 BC848C
7400 BC848C
FTP5
FTP6
3499 DIV

Feature-Box-Platine (Natürliche Bewegung) / Platine Boîtier Numérique (mouvement natural)


M2
7443 MSM5412222
7445 TMS4C2970
7444 MSM5412222
7446 TMS4C2970
7447 SAA4991WP MELZONIC
7450 SAA4970
7460 78L05ACD
7461 BC848C
7490 PMBT2369
7493 BC858C
7492 PMBT2369
7500 BC848C
7505 S87C654-4B44
PINS NC:1, 14, 21, 24, 25, 26
7506 BC858C
7504 PMBT2369
6500 BZX79-F8V2
1485 12MHz
Y FEAT
U FEAT
V FEAT
F48
F49
SDA
SCL
TO SMALL SIGNAL PANEL
TO SMALL SIGNAL PANEL
CHASSIS MD2.2
+5V
+5A
+5B
+5R
+13V
Vpor

1001	K11
2006	H 3
2007	B14
2008	G 8
2009	K13
2010	H17
2011	K11
2012	K12
3004	G15
3005	G16
3006	H10
4001	C 3
4002	D 3
4003	K10
4004	F 3
4005	C11
4006	H 3
4007	A15
4008	G 8
4009	J13
4010	H17
4011	D11
4012	E11
4013	F11
4014	C18
4015	D18
4016	E18
4017	F18
4018	I 2
4019	I 2
7006	C 3
7007	A12
7008	C 8
7009	I10
7010	C17
AR67	J 2
AR67	F 2
AR67	G 2
AR67	E22
AR67	D22
AR67	D22
AR67	D22
AR67	D22
AR67	D22
AR67	C22
AR67	C22
AR67	E22
AR67	E22
AR67	F22
AR67	E22
AR67	J 2
AR67	F22
AR67	K 2
AR67	I 2
AR67	I 2
AR67	K 2
AR67	K 2
AR67	J 2
AR67	F 2
AR67	I 2
AR67	E 2
AR67	F 2
AR67	E 2
AR67	E 2
AR67	C 2
AR67	C 2
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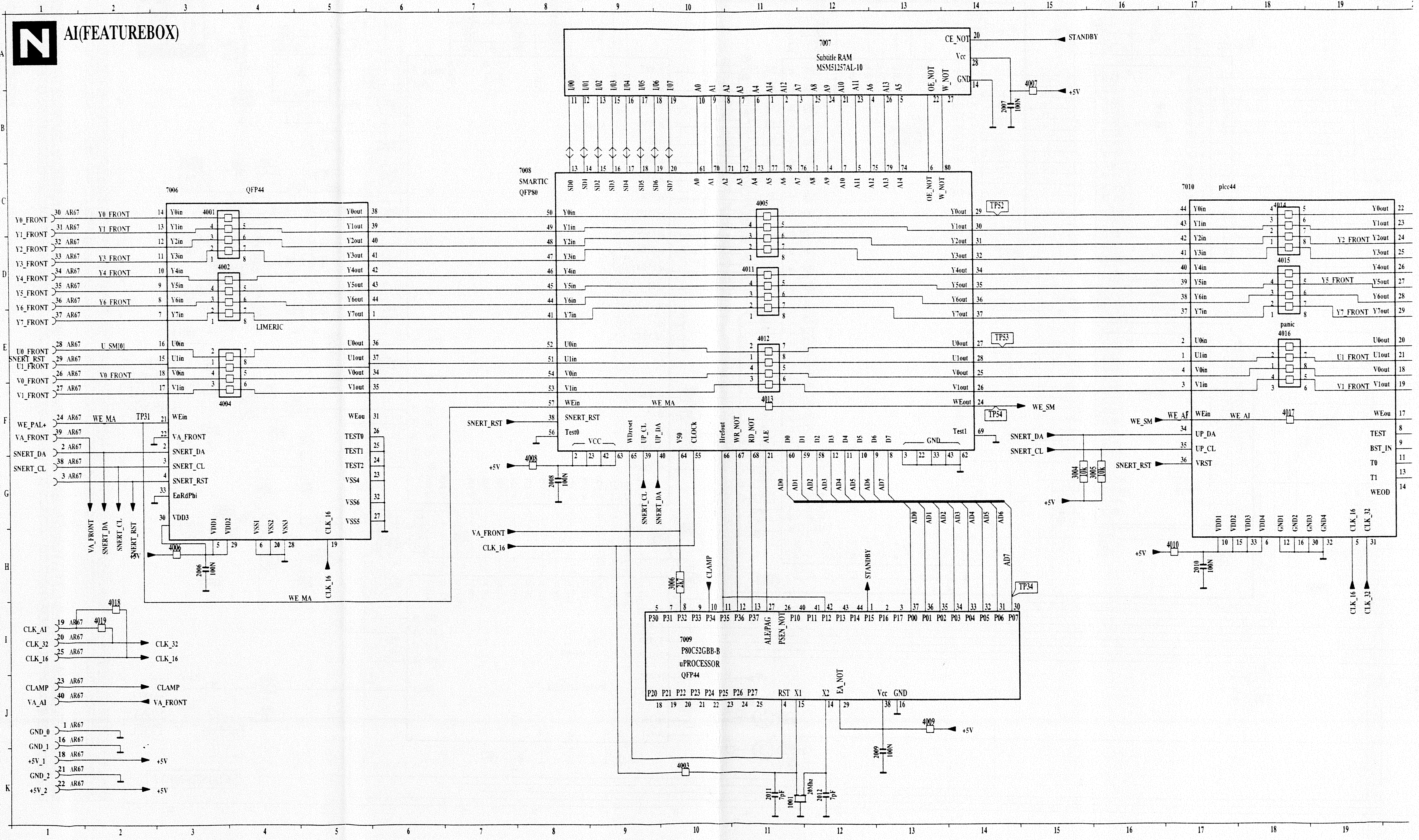
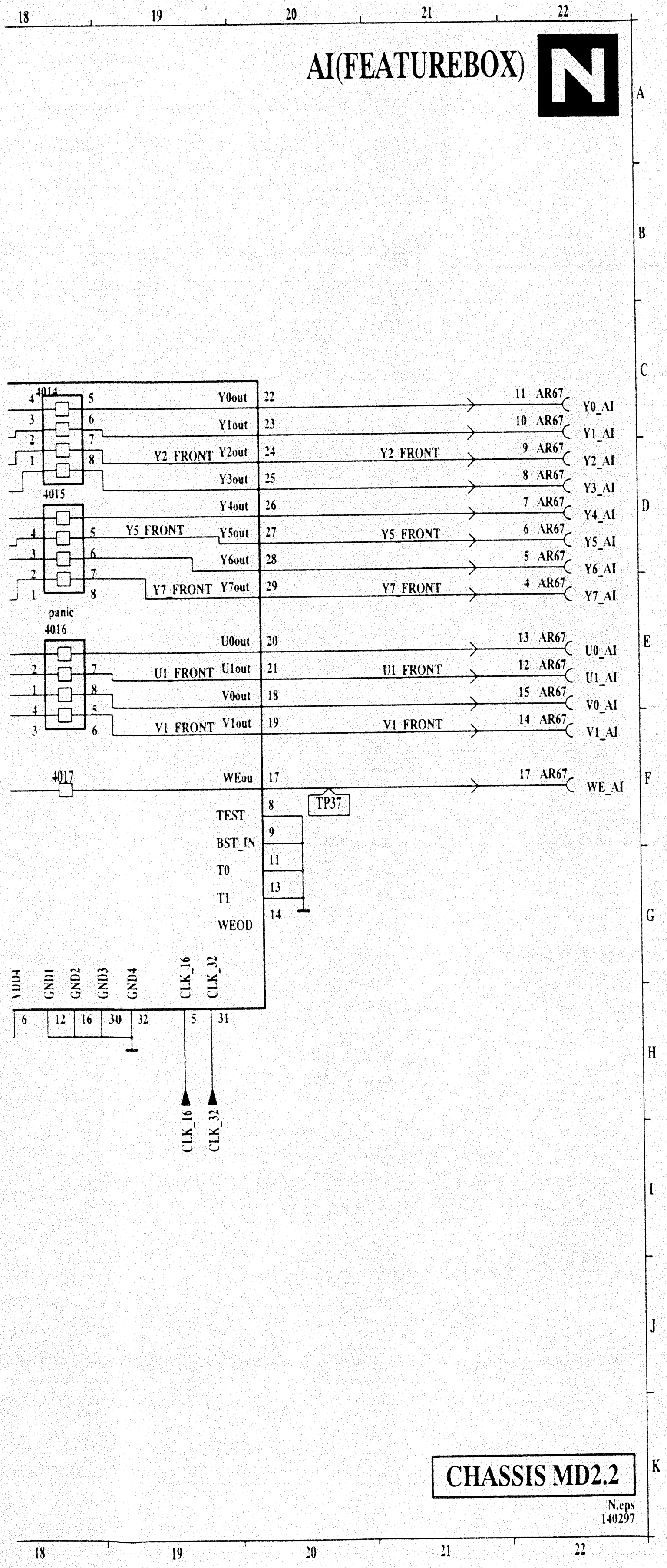
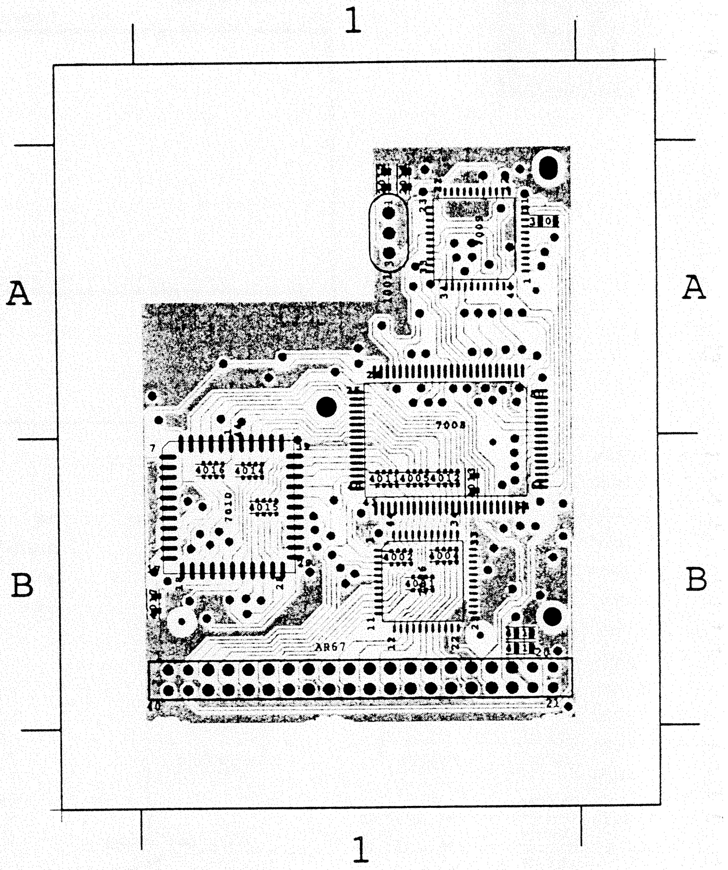
AR67	G 2
AR67	F 2
AR67	J 2


N
AI(FEATUREBOX)
7007
Subtitle RAM
MSM51257AL-10
CE_NOT
Vcc
GND
STANDBY
4007
+5V
2007 100N
7008
SMARTIC
QFP80
7006
QFP44
LIMERIC
7010
plcc44
panic
TP52
TP53
TP54
TP31
TP34
Y0_FRONT
Y1_FRONT
Y2_FRONT
Y3_FRONT
Y4_FRONT
Y5_FRONT
Y6_FRONT
Y7_FRONT
U0_FRONT
SNERT_RST
U1_FRONT
V0_FRONT
V1_FRONT
WE_PAL+
VA_FRONT
SNERT_DA
SNERT_CL
WE_MA
WE_SM
WE_AF
WE_AI
CLK_AI
CLK_32
CLK_16
CLAMP
VA_AI
GND_0
GND_1
+5V_1
GND_2
+5V_2
7009
P80C52GBB-B
uPROCESSOR
QFP44
ALE/PAG
PSEN_NOT
EA_NOT
RST
X1
X2
1001 20Mhz
2011 7pF
2012 7pF
2009 100N
2008 100N
2006 100N
2010 100N
3004 10K
3005 10K
3006 2K7
4001
4002
4003
4004
4005
4006
4008
4009
4010
4011
4012
4013
4014
4015
4016
4017
4018
4019
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
A B C D E F G H I J K

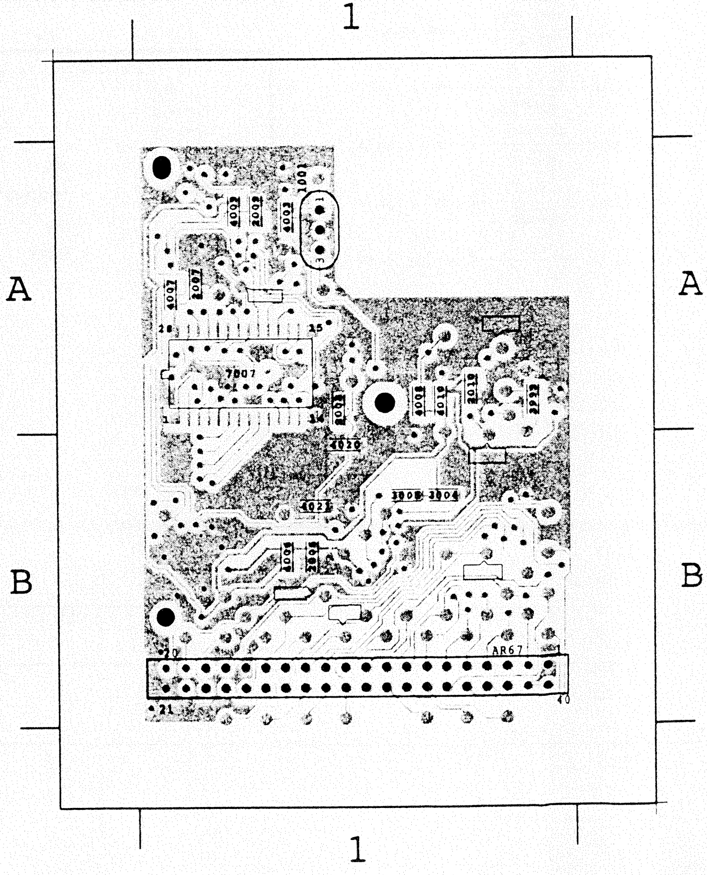
Platine AI (Intelligence Artificielle)

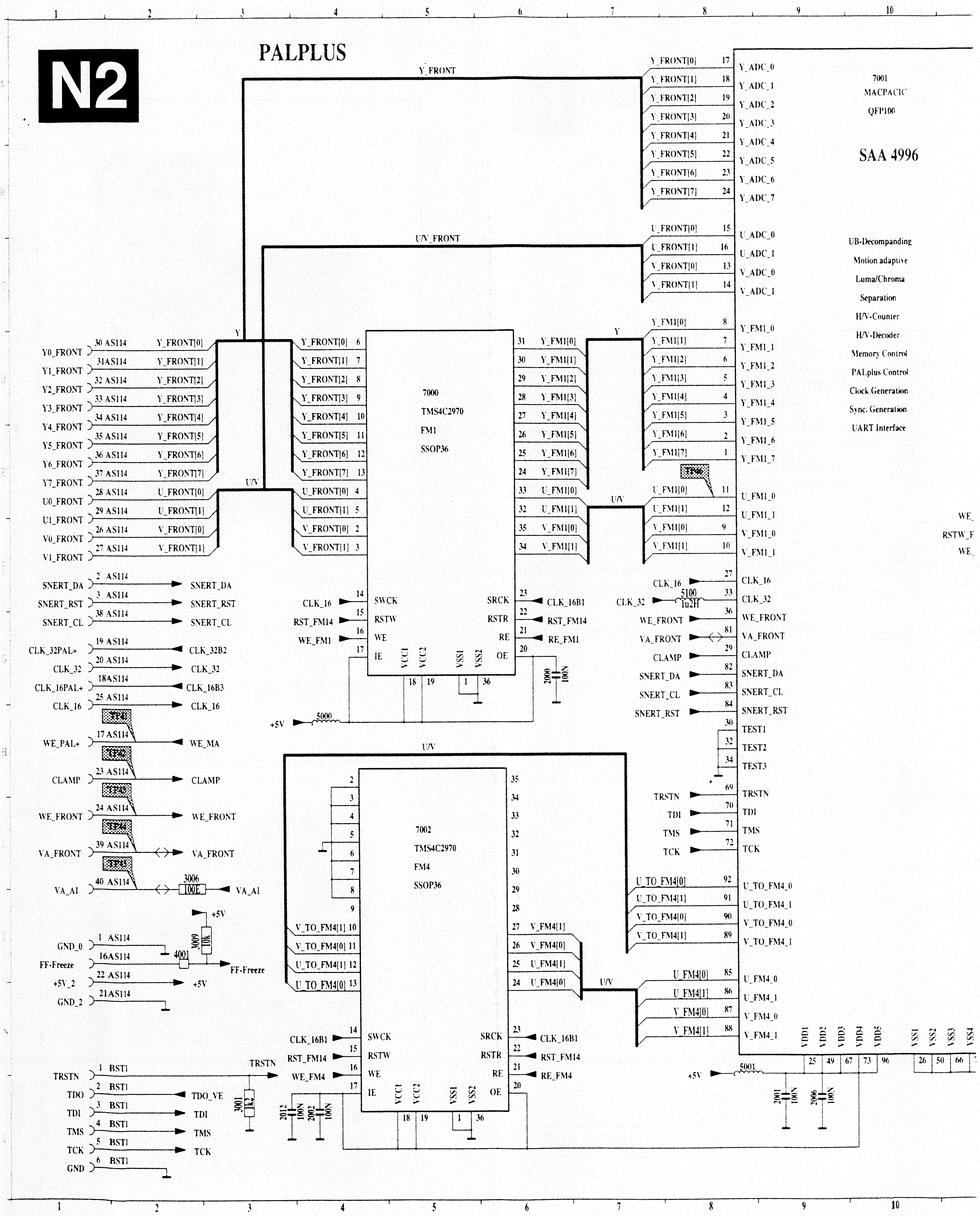

AI(FEATUREBOX)
N
18
19
20
21
22
A
B
C
D
E
F
G
H
I
J
K
4014
4015
4016
panic
4017
Y0out
Y1out
Y2 FRONT
Y2out
Y3out
Y4out
Y5 FRONT
Y5out
Y6out
Y7 FRONT
Y7out
U0out
U1 FRONT
U1out
V0out
V1 FRONT
V1out
WEou
TEST
BST_IN
T0
T1
WEOD
TP37
VDD4
GND1
GND2
GND3
GND4
CLK_16
CLK_32
AR67
Y0_AI
Y1_AI
Y2_AI
Y3_AI
Y4_AI
Y5_AI
Y6_AI
Y7_AI
U0_AI
U1_AI
V0_AI
V1_AI
WE_AI
CHASSIS MD2.2
N.eps
140297

1001 A 1	4001 B 1	4011 B 1	4015 B 1	4019 B 1	7010 B 1
2011 A 1	4002 B 1	4012 B 1	4016 B 1	7006 B 1	AR67 B 1
2012 A 1	4004 B 1	4013 B 1	4017 B 1	7008 B 1	
3006 A 1	4005 B 1	4014 B 1	4018 B 1	7009 A 1	

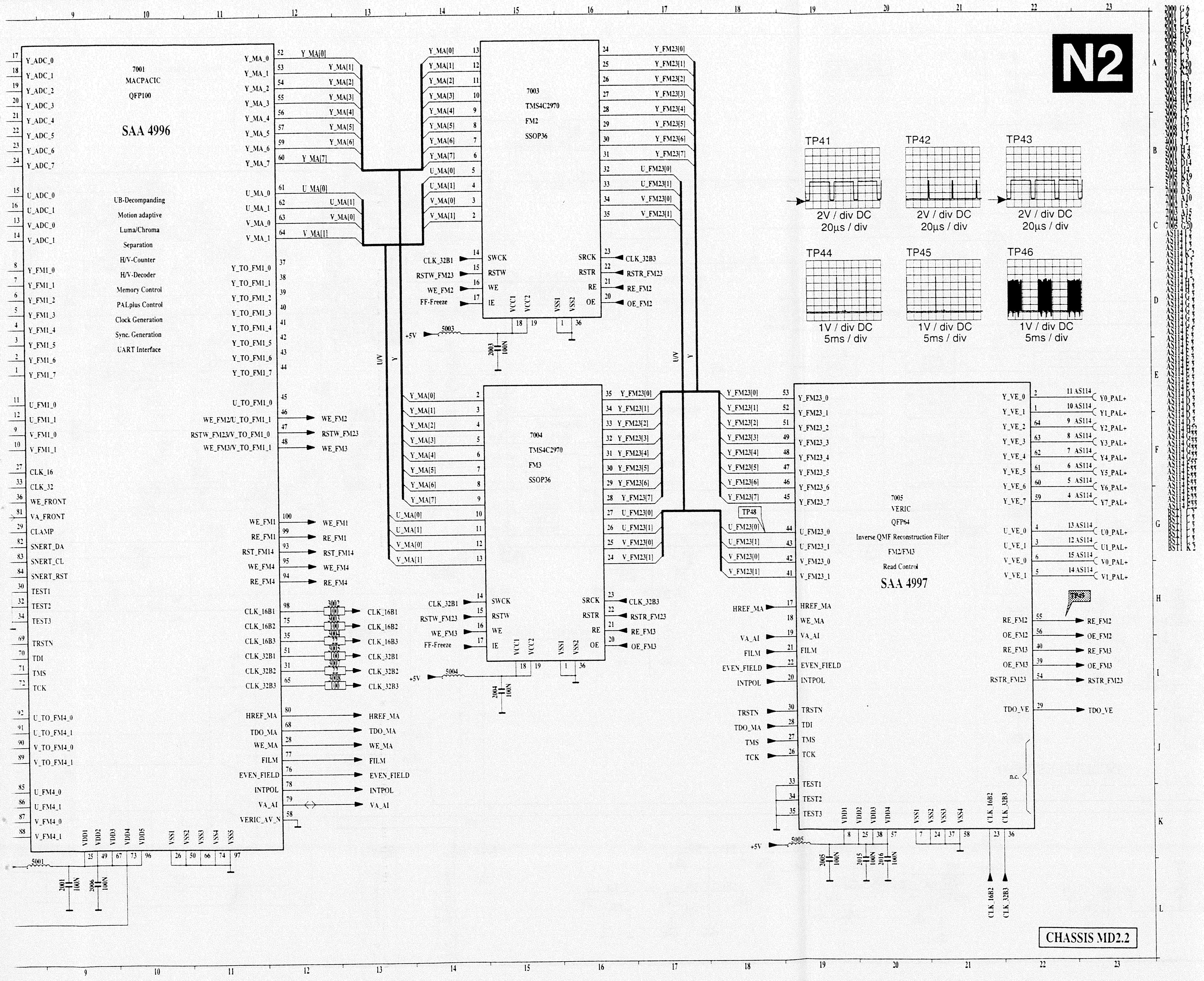

1
A
B
1001
7006
7008
7010
4016
4011
4012
4013
4004
4005
4001
4002
4014
AR67
40
21

1001 A 1	2008 A 1	3004 B 1	4003 A 1	4008 A 1	4020 B 1	AR67 B 1
2006 B 1	2009 A 1	3005 B 1	4006 B 1	4009 A 1	4021 B 1	
2007 A 1	2010 A 1	3999 A 1	4007 A 1	4010 A 1	7007 A 1	

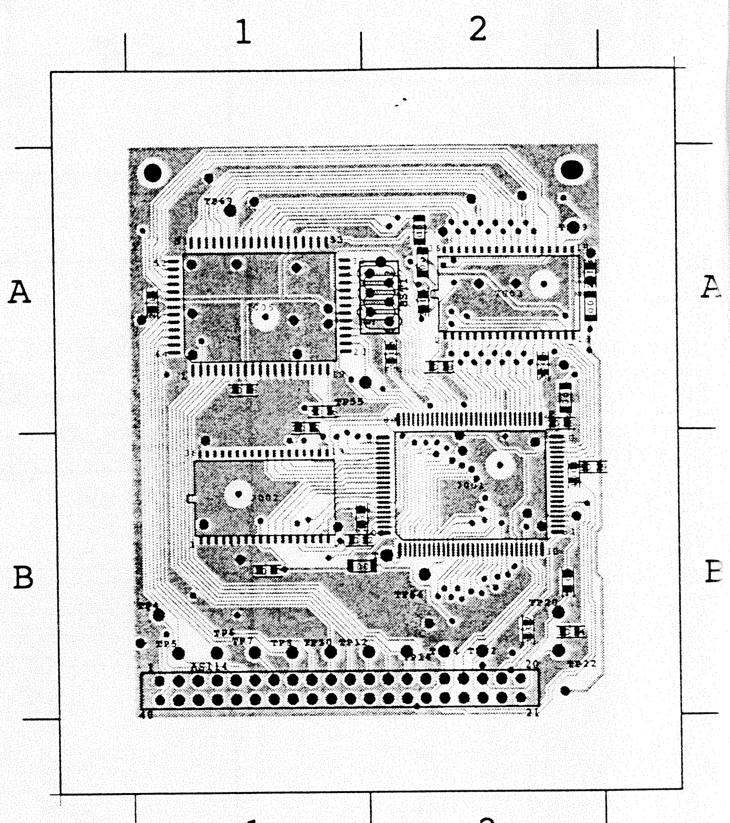

1
A
B
1001
4003
2008
2009
4007
2007
7007
4020
4008
4010
2010
4021
3005
3004
4006
2006
AR67
21
40


N2
PALPLUS
Y_FRONT
U/V_FRONT
Y
U/V
7000
TMS4C2970
FM1
SSOP36
7001
MACPACIC
QFP100
SAA 4996
UB-Decompanding
Motion adaptive
Luma/Chroma
Separation
H/V-Counter
H/V-Decoder
Memory Control
PALplus Control
Clock Generation
Sync. Generation
UART Interface
7002
TMS4C2970
FM4
SSOP36
Y0_FRONT
Y1_FRONT
Y2_FRONT
Y3_FRONT
Y4_FRONT
Y5_FRONT
Y6_FRONT
Y7_FRONT
U0_FRONT
U1_FRONT
V0_FRONT
V1_FRONT
SNERT_DA
SNERT_RST
SNERT_CL
CLK_32PAL+
CLK_32
CLK_16PAL+
CLK_16
CLK_32B2
CLK_16B3
WE_PAL+
WE_MA
CLAMP
WE_FRONT
VA_FRONT
VA_AI
3006
100E
GND_0
FF-Freeze
+5V_2
GND_2
3009
10K
4001
+5V
TRSTN
TDO
TDI
TMS
TCK
GND
TDO_VE
3001
1K2
AS114
BST1
TP1
TP2
TP3
TP4
TP5
TP6
SWCK
RSTW
WE
IE
VCC1
VCC2
VSS1
VSS2
SRCK
RSTR
RE
OE
CLK_16B1
RST_FM14
WE_FM1
RE_FM1
WE_FM4
RE_FM4
5000
2000
100N
2012
2002
100N
Y_FRONT[0]
Y_FRONT[7]
U_FRONT[0]
U_FRONT[1]
V_FRONT[0]
V_FRONT[1]
Y_FM1[0]
Y_FM1[7]
U_FM1[0]
U_FM1[1]
V_FM1[0]
V_FM1[1]
Y_ADC_0
Y_ADC_7
U_ADC_0
U_ADC_1
V_ADC_0
V_ADC_1
Y_FM1_0
Y_FM1_7
U_FM1_0
U_FM1_1
V_FM1_0
V_FM1_1
CLK_16
CLK_32
5100
1u2H
TEST1
TEST2
TEST3
V_TO_FM4[1]
V_TO_FM4[0]
U_TO_FM4[1]
U_TO_FM4[0]
U_TO_FM4_0
U_TO_FM4_1
V_TO_FM4_0
V_TO_FM4_1
V_FM4[1]
V_FM4[0]
U_FM4[1]
U_FM4[0]
U_FM4_0
U_FM4_1
V_FM4_0
V_FM4_1
VDD1
VDD2
VDD3
VDD4
VDD5
VSS1
VSS2
VSS3
VSS4
5001
2001
100N
2006
100N
WE_
RSTW_F
WE_

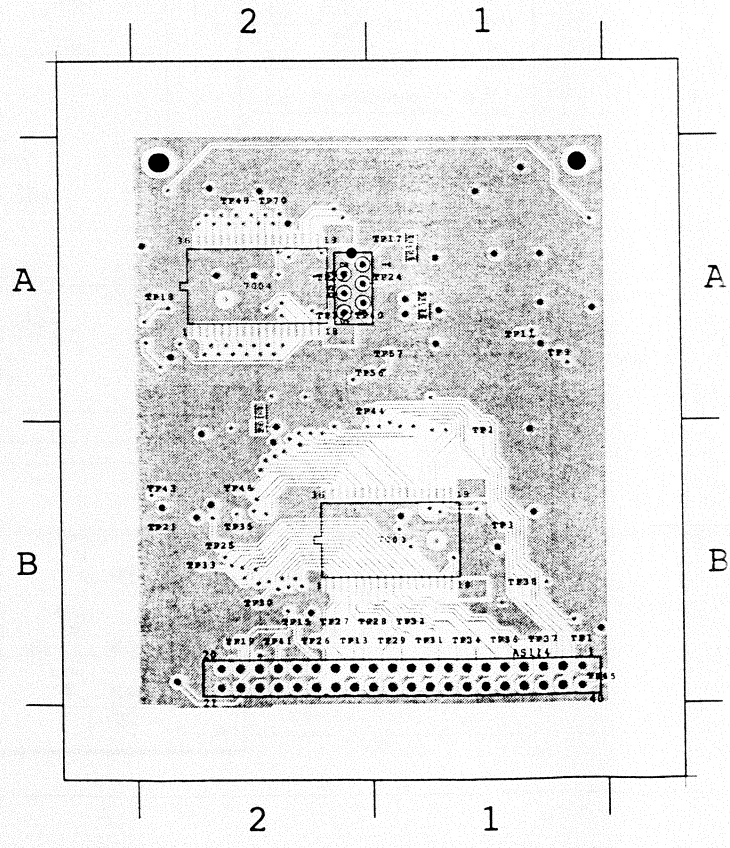
PALplus panel / PALplus-Platine / Platine PALplus


N2
7001
MACPACIC
QFP100
SAA 4996
UB-Decompanding
Motion adaptive
Luma/Chroma
Separation
H/V-Counter
H/V-Decoder
Memory Control
PALplus Control
Clock Generation
Sync. Generation
UART Interface
7003
TMS4C2970
FM2
SSOP36
7004
TMS4C2970
FM3
SSOP36
7005
VERIC
QFP64
Inverse QMF Reconstruction Filter
FM2/FM3
Read Control
SAA 4997
TP41
2V / div DC
20µs / div
TP42
2V / div DC
20µs / div
TP43
2V / div DC
20µs / div
TP44
1V / div DC
5ms / div
TP45
1V / div DC
5ms / div
TP46
1V / div DC
5ms / div
TP48
TP49
CHASSIS MD2.2

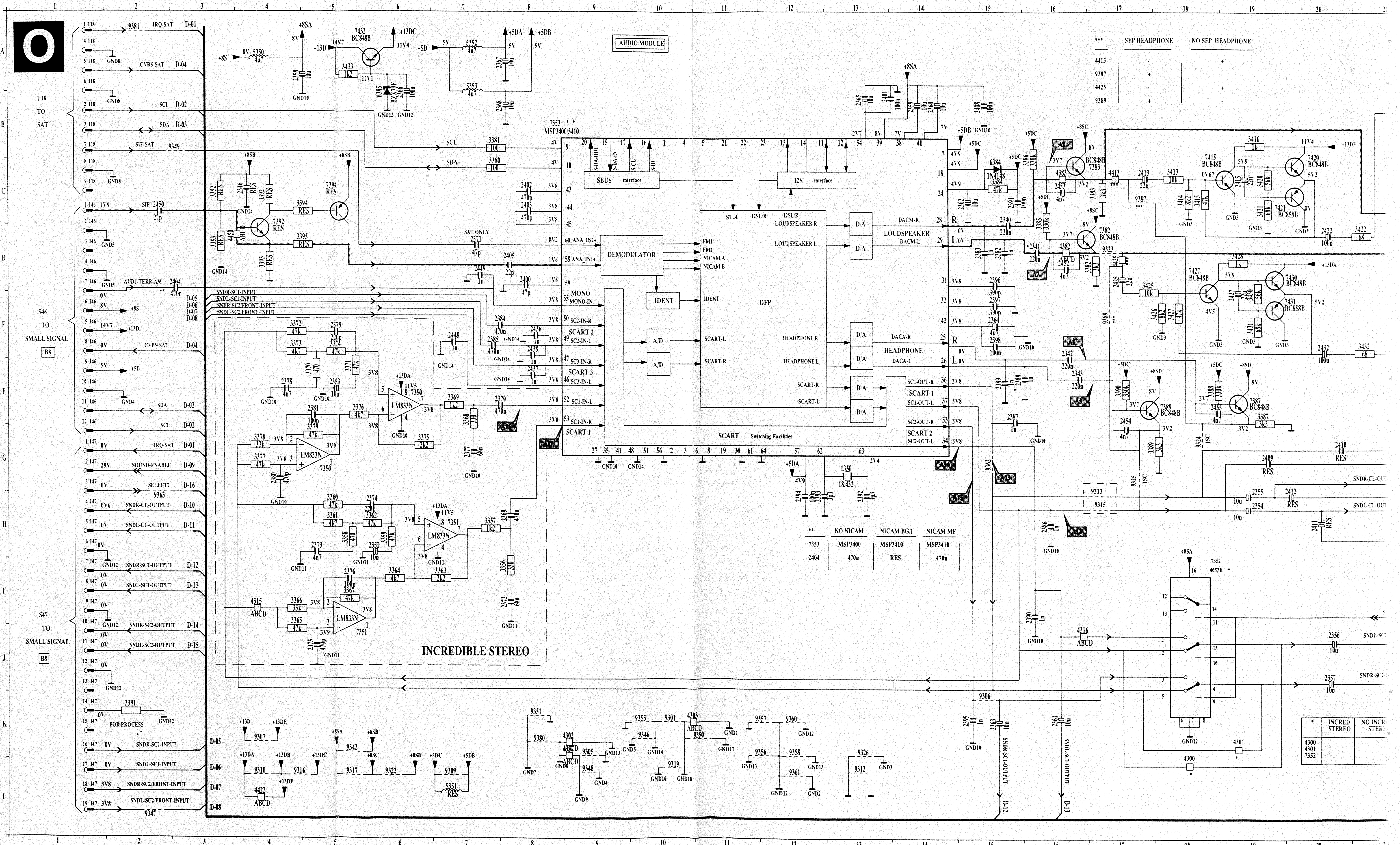
2000	B	1
2002	B	1
2003	A	2
2004	A	2
2006	A	2
2012	A	1
2015	A	1
2016	A	1
3002	B	1
3003	A	2
3004	B	2
3005	A	2
3006	A	1
3007	B	2
3008	A	2
3009	B	2
4001	B	2
5000	B	1
5001	A	2
5003	A	2
5004	A	2
5005	A	2
5100	B	2
7001	B	2
7002	B	1
7003	A	2
7005	A	1
AS114	B	1
BST1	A	2
TP4	B	1
TP5	B	1
TP6	B	1
TP7	B	1
TP8	B	1
TP10	B	1
TP12	B	1
TP14	B	2
TP16	B	2
TP20	B	2
TP22	B	2
TP42	B	2
TP49	A	2
TP55	A	1
TP63	B	2
TP64	B	2
TP69	A	1


1
2
A
B
1
2
TP4
TP5
TP6
TP8
TP10
TP12
TP22
AS114
BST1
46
21

2001	A	2
2005	A	1
3001	A	1
7000	B	1
7004	A	2
AS114	B	1
BST1	A	2
TP1	B	1
TP2	B	1
TP3	B	1
TP9	A	1
TP11	A	1
TP13	B	2
TP15	B	2
TP17	A	1
TP18	A	2
TP19	B	2
TP21	B	2
TP23	A	2
TP24	A	1
TP25	B	2
TP26	B	2
TP27	B	2
TP28	B	1
TP29	B	1
TP30	B	2
TP31	B	1
TP32	B	1
TP33	B	2
TP34	B	1
TP35	B	2
TP36	B	1
TP37	B	1
TP38	B	1
TP39	A	2
TP40	A	1
TP41	B	2
TP43	B	2
TP44	A	1
TP45	B	1
TP46	B	2
TP48	A	2
TP56	A	1
TP57	A	1
TP70	A	2


2
1
A
B
2
1
TP49
TP70
TP17
TP18
TP24
7004
TP11
TP57
TP56
TP44
TP1
TP43
TP45
TP23
TP35
TP25
TP13
TP38
TP30
TP27
TP28
TP26
TP29
TP31
TP34
TP36
TP37
AS114

Audio module (no dolby) / Audio-Modul (kein Dolby) / Module audio

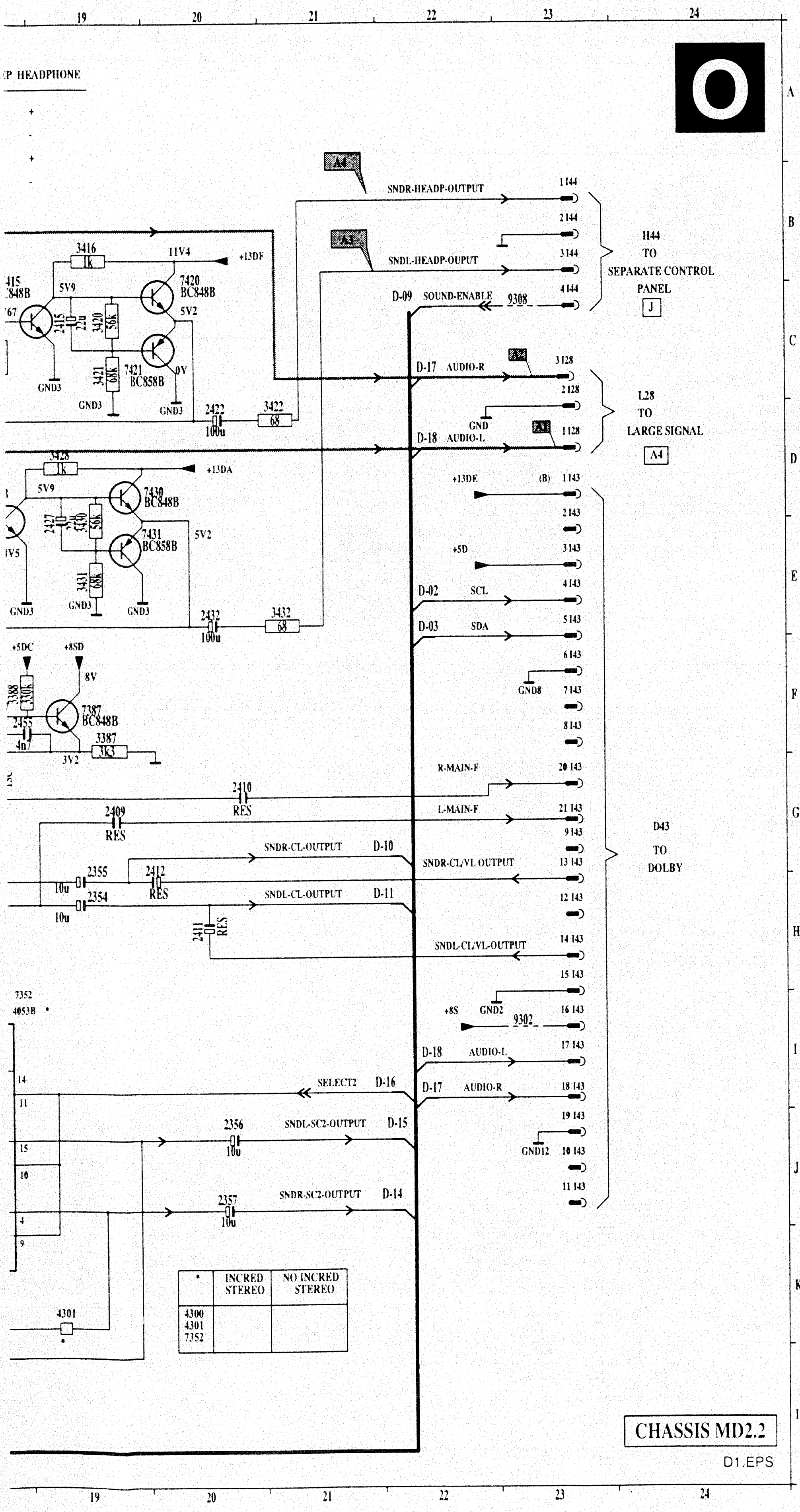

O
AUDIO MODULE
T18 TO SAT
S46 TO SMALL SIGNAL B8
S47 TO SMALL SIGNAL B8
IRQ-SAT D-01
CVBS-SAT D-04
SCL D-02
SDA D-03
SIF-SAT
AUDI-TERR-AM
SOUND-ENABLE D-09
SELECT2 D-16
SNDR-CL-OUTPUT D-10
SNDL-CL-OUTPUT D-11
SNDR-SC1-OUTPUT D-12
SNDL-SC1-OUTPUT D-13
SNDR-SC2-OUTPUT D-14
SNDL-SC2-OUTPUT D-15
FOR PROCESS
SNDR-SC1-INPUT D-05
SNDL-SC1-INPUT D-06
SNDR-SC2/FRONT-INPUT D-07
SNDL-SC2/FRONT-INPUT D-08
7353 MSP3400/3410
SBUS interface
I2S interface
DEMODULATOR
IDENT
DFP
A/D
D/A
LOUDSPEAKER
HEADPHONE
SCART 1
SCART 2
SCART 3
SCART Switching Facilities
MONO
LM833N
INCREDIBLE STEREO
7350
7351
7352 4053B
BC848B
BC858B
18.432
PCS 91 174

***	SEP HEADPHONE	NO SEP HEADPHONE
4413	-	+
9387	+	-
4425	-	+
9389	+	-

**	NO NICAM	NICAM BG/I	NICAM MF
7353	MSP3400	MSP3410	MSP3410
2404	470n	RES	470n

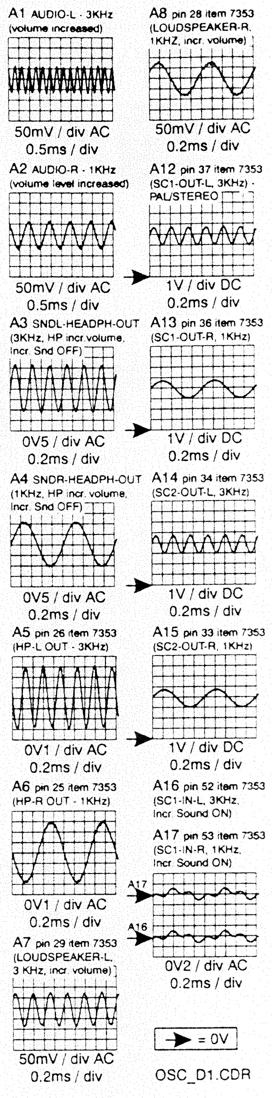
*	INCRED STEREO	NO INCR STERI
4300 4301 7352		

Module audio (non Dolby)

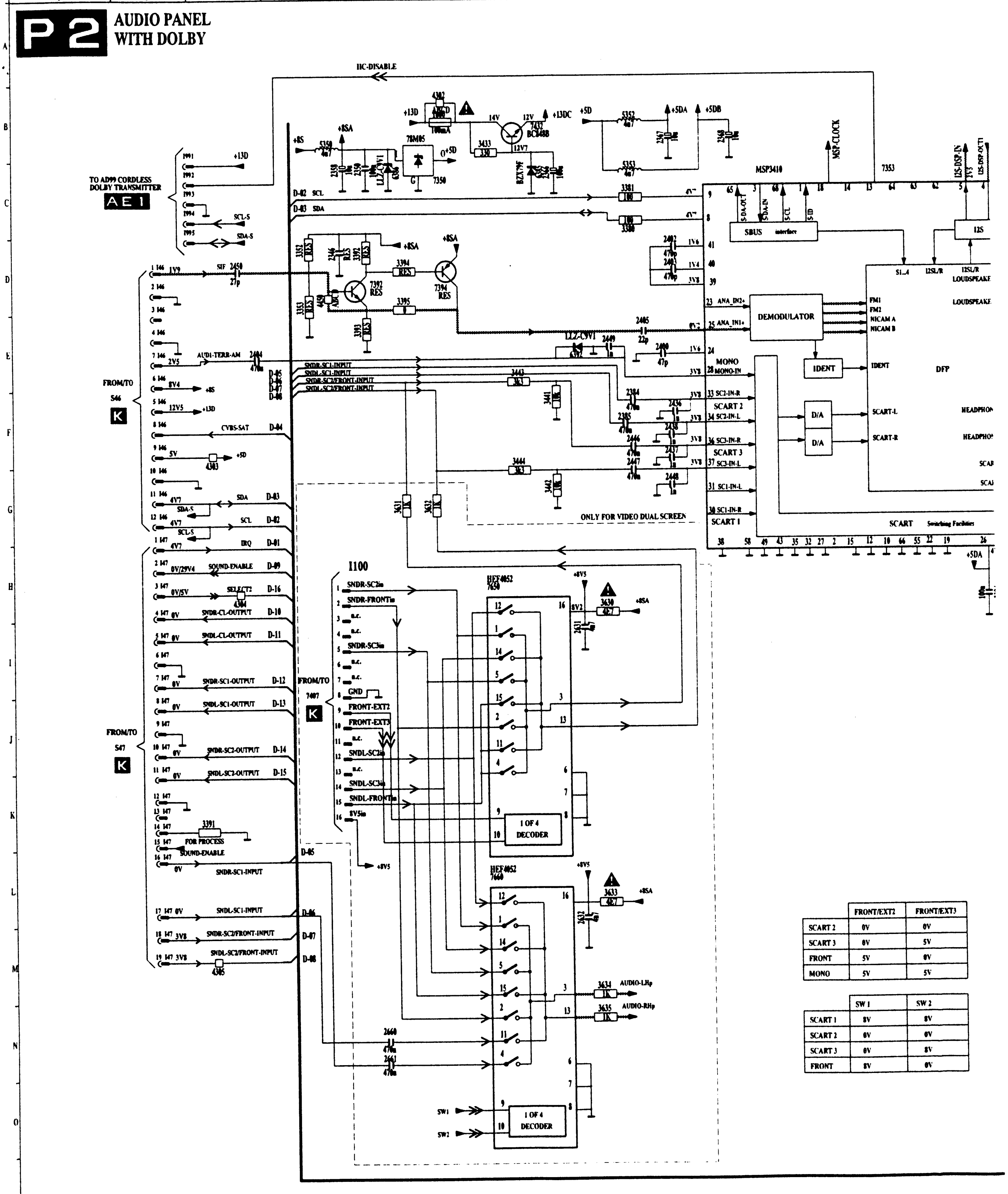

19
20
21
22
23
24
A
B
C
D
E
F
G
H
I
J
K
L
O
P HEADPHONE
A4
SNDR-HEADP-OUTPUT
A3
SNDL-HEADP-OUPUT
D-09 SOUND-ENABLE
9308
1 144
2 144
3 144
4 144
H44
TO
SEPARATE CONTROL
PANEL
J
3416
1k
11V4
+13DF
7420
BC848B
5V9
5V2
415
848B
67
2415
22u
3420
56k
3421
68K
7421
BC858B
0V
GND3
2422
100u
3422
68
A2
D-17 AUDIO-R
3 128
2 128
1 128
GND
A1
D-18 AUDIO-L
L28
TO
LARGE SIGNAL
A4
3428
1k
+13DA
5V9
7430
BC848B
2427
3430
56k
7431
BC858B
5V2
3431
68K
1V5
2432
100u
3432
68
+13DE
(B)
1 143
2 143
+5D
3 143
D-02 SCL
4 143
D-03 SDA
5 143
6 143
GND8
7 143
8 143
+5DC
+8SD
8V
3388
330K
7387
BC848B
2455
4n7
3387
3k3
3V2
R-MAIN-F
20 143
2410
RES
2409
RES
L-MAIN-F
21 143
9 143
D43
TO
DOLBY
SNDR-CL-OUTPUT
D-10
SNDR-CL/VL OUTPUT
13 143
2355
10u
2412
RES
2354
10u
SNDL-CL-OUTPUT
D-11
12 143
2411
RES
SNDL-CL/VL-OUTPUT
14 143
15 143
7352
4053B
+8S
GND2
9302
16 143
D-18 AUDIO-L
17 143
14
11
SELECT2
D-16
D-17 AUDIO-R
18 143
15
10
2356
10u
SNDL-SC2-OUTPUT
D-15
19 143
GND12
10 143
11 143
2357
10u
SNDR-SC2-OUTPUT
D-14
4
9
4301
CHASSIS MD2.2
D1.EPS

•	INCRED STEREO	NO INCRED STEREO
4300 4301 7352		

1350	G13
2340	C15
2341	D16
2342	E16
2343	F16
2346	C4
2352	H6
2353	F5
2354	H19
2355	G19
2356	J20
2357	J20
2358	A4
2359	B14
2360	B14
2361	K16
2362	C15
2363	K15
2364	E15
2365	B13
2366	A6
2367	A8
2368	B8
2369	H8
2370	F8
2371	D7
2372	I8
2373	H5
2374	H6
2375	J5
2376	I5
2377	G7
2378	F4
2379	E5
2380	G4
2381	F5
2382	D15
2383	D15
2384	E8
2385	E7
2386	H16
2387	F15
2388	F15
2389	F15
2390	I16
2391	C15
2392	H13
2393	H12
2394	H12
2395	K15
2396	D15
2397	E15
2398	E15
2400	D8
2401	B13
2402	C8
2403	C8
2404	D3
2405	D8
2408	B15
2409	G19
2410	G20
2411	H20
2412	G20
2413	C17
2415	C19
2422	D20
2425	D17
2427	D19
2432	E20
2436	F8
2437	F8
2438	E8
2448	F7
2449	D7
2450	C2
2452	D16
2453	C16
2454	F17
2455	F18
3352	C3
3353	D3
3356	I8
3357	H7
3358	H5
3359	H6
3360	H5
3361	H5
3362	H6
3363	I7
3364	I6
3365	I4
3366	I4
3367	I5
3368	F7
3369	F7
3370	F5
3371	F5
3372	F4
3373	F4
3374	F5
3375	G6
3376	F5
3377	G4
3378	G4
3379	G5
3380	B7
3381	B7
3382	D17
3383	C17
3384	C15
3385	C16
3386	B16
3387	F19
3388	F18
3389	G17
3390	F17
3391	K2
3392	C4
3393	D4
3394	C5
3395	D5
3413	C18
3414	C18
3415	C18
3416	B19
3420	C19
3421	C19
3422	D21
3425	D17
3426	E18
3427	E18
3428	D19
3430	D19
3431	E19
3432	E21
3433	A5
4300	K18
4301	K19
4302	K9
4303	K10
4315	I4
4316	J16
4357	K9
4382	D16
4383	C16
4413	C17
4422	L4
4425	D17
4450	D3
5350	A4
5351	L7
5352	A7
5353	A7
6384	C15
6385	A6
7350	G5
7350	F6
7351	J5
7351	H7
7352	I18
7353	B8
7382	D17
7383	C17
7387	F19
7389	F18
7392	C4
7394	C5
7415	B18
7420	B20
7421	C19
7427	D18
7430	D19
7431	E19
7432	A5
9301	K10
9302	I23
9305	K9
9306	J15
9307	K4
9308	C23
9309	L7
9310	L4
9312	L13
9313	G17
9315	H17
9316	L4
9317	L5
9319	L10
9322	L6
9323	D17
9324	G18
9325	G17
9326	K13
9342	K5
9346	K10
9347	L2
9348	L9
9349	B3
9350	K11
9351	K8
9353	K10
9356	K12
9357	K12
9358	K12
9360	K12
9361	L12
9362	G15
9363	H2
9380	K8
9381	A2
9387	C17
9389	E17
D-01	G3
D-02	B3
D-03	B3
D-04	A3
D-05	E3
D-06	E3
D-07	E3
D-08	E3
D-09	G3
D-10	H3
D-11	H3
D-12	I3
D-13	I3
D-14	J3
D-15	J3
D-16	G3
D-17	I22
D-18	I22
I18	C1
I28	C23
I43	J23
I44	C23
I46	E1
I47	L1

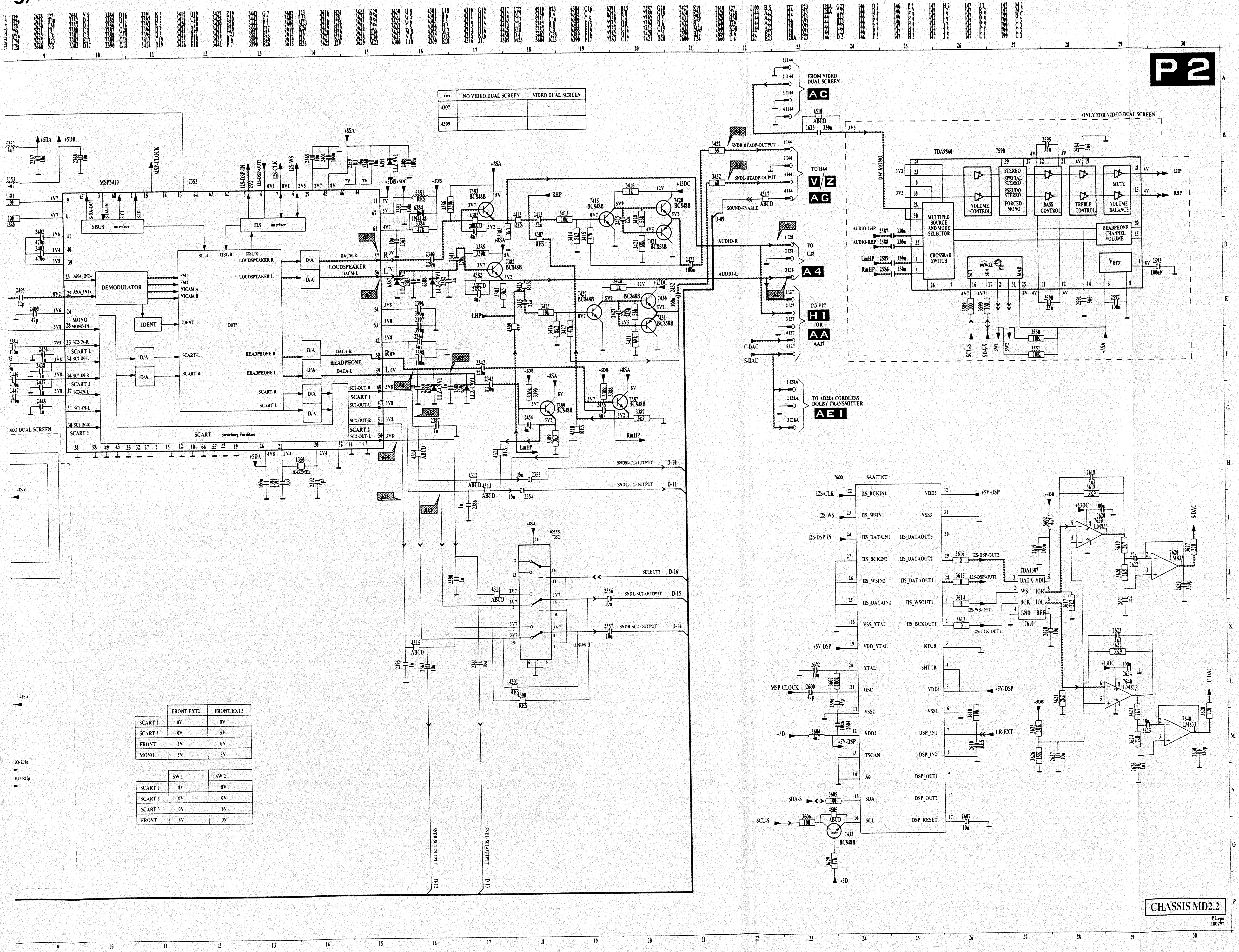


Dolby audio module (with VDS audio processing) / MD 2.21/2.22/2.23


P 2
AUDIO PANEL WITH DOLBY
IIC-DISABLE
TO AD99 CORDLESS DOLBY TRANSMITTER
AE 1
FROM/TO S46
K
FROM/TO S47
K
FROM/TO 7407
K
MSP3410
MSP-CLOCK
SBUS interface
I2S
DEMODULATOR
IDENT
D/A
D/A
DFP
LOUDSPEAKER
HEADPHONE
SCART
Switching Facilities
SCART 1
SCART 2
SCART 3
MONO
ONLY FOR VIDEO DUAL SCREEN
1100
HEF4052 7650
HEF4052 7660
1 OF 4 DECODER
1 OF 4 DECODER
78M05
7350
BC848B
7432
7392
7394
AUDIO-LHp
AUDIO-RHp
SW1
SW2
SNDR-SC1-INPUT
SNDL-SC1-INPUT
SNDR-SC2/FRONT-INPUT
SNDL-SC2/FRONT-INPUT
SOUND-ENABLE
SELECT2
SNDR-CL-OUTPUT
SNDL-CL-OUTPUT
SNDR-SC1-OUTPUT
SNDL-SC1-OUTPUT
SNDR-SC2-OUTPUT
SNDL-SC2-OUTPUT
FOR PROCESS
CVBS-SAT
AUDI-TERR-AM
SDA
SCL
IRQ
+8SA
+5DA
+5DB
+13D
+13DC
+8V5

	FRONT/EXT2	FRONT/EXT3
SCART 2	0V	0V
SCART 3	0V	5V
FRONT	5V	0V
MONO	5V	5V

	SW 1	SW 2
SCART 1	8V	8V
SCART 2	0V	0V
SCART 3	0V	8V
FRONT	8V	0V

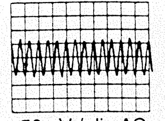

P2
MSP3410
7353
SBUS interface
I2S interface
DEMODULATOR
IDENT
DFP
D/A
LOUDSPEAKER
HEADPHONE
SCART Switching Facilities
MSP-CLOCK
FROM VIDEO DUAL SCREEN
AC
TO H44
V Z
AG
TO L28
A4
TO V27
H1
OR
AA
TO AD28A CORDLESS DOLBY TRANSMITTER
AE1
ONLY FOR VIDEO DUAL SCREEN
TDA9860
MULTIPLE SOURCE AND MODE SELECTOR
CROSSBAR SWITCH
VOLUME CONTROL
STEREO SPECIAL STEREO PSEUDO STEREO FORCED MONO
BASS CONTROL
TREBLE CONTROL
MUTE VOLUME BALANCE
HEADPHONE CHANNEL VOLUME
SAA7710T
TDA1387
LM833
BC848B
BC858B
SNDR-HEADP-OUTPUT
SNDL-HEADP-OUTPUT
SOUND-ENABLE
AUDIO-R
AUDIO-L
C-DAC
S-DAC
SNDR-CL-OUTPUT D-10
SNDL-CL-OUTPUT D-11
SELECT2 D-16
SNDL-SC2-OUTPUT D-15
SNDR-SC2-OUTPUT D-14
CHASSIS MD2.2

•••	NO VIDEO DUAL SCREEN	VIDEO DUAL SCREEN
4307		•
4309		•

	FRONT EXT2	FRONT/EXT3
SCART 2	0V	0V
SCART 3	0V	5V
FRONT	5V	0V
MONO	5V	5V

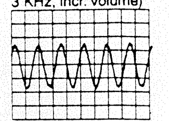
	SW 1	SW 2
SCART 1	8V	8V
SCART 2	0V	0V
SCART 3	0V	8V
FRONT	8V	0V

A1 AUDIO-L - 3KHz (volume increased)



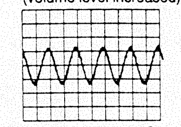
50mV / div AC
0.5ms / div

A7 pin 56 item 7353 (LOUDSPEAKER-L, 3 KHz, incr. volume)



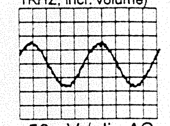
50mV / div AC
0.2ms / div

A2 AUDIO-R - 1KHz (volume level increased)



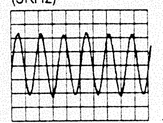
50mV / div AC
0.5ms / div

A8 pin 57 item 7353 (LOUDSPEAKER-R, 1KHZ, incr. volume)



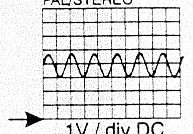
50mV / div AC
0.2ms / div

A3 SNDL-HEADPH-OUT (3KHz)



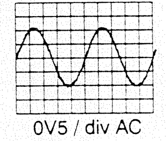
0V5 / div AC
0.2ms / div

A12 pin 48 item 7353 (SC1-OUT-L, 3KHz) - PAL/STEREO



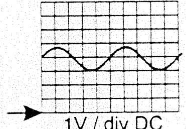
1V / div DC
0.2ms / div

A4 SNDR-HEADPH-OUT (1KHz, HP incr. volume)



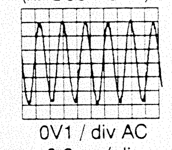
0V5 / div AC
0.2ms / div

A13 pin 47 item 7353 (SC1-OUT-R, 1KHz)



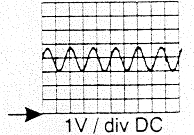
1V / div DC
0.2ms / div

A5 pin 59 item 7353 (HP-L OUT - 3KHz)



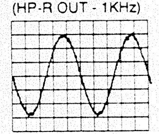
0V1 / div AC
0.2ms / div

A14 pin 50 item 7353 (SC2-OUT-L, 3KHz)



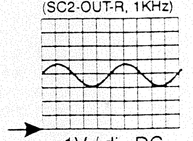
1V / div DC
0.2ms / div

A6 pin 60 item 7353 (HP-R OUT - 1KHz)



0V1 / div AC
0.2ms / div

A15 pin 51 item 7353 (SC2-OUT-R, 1KHz)

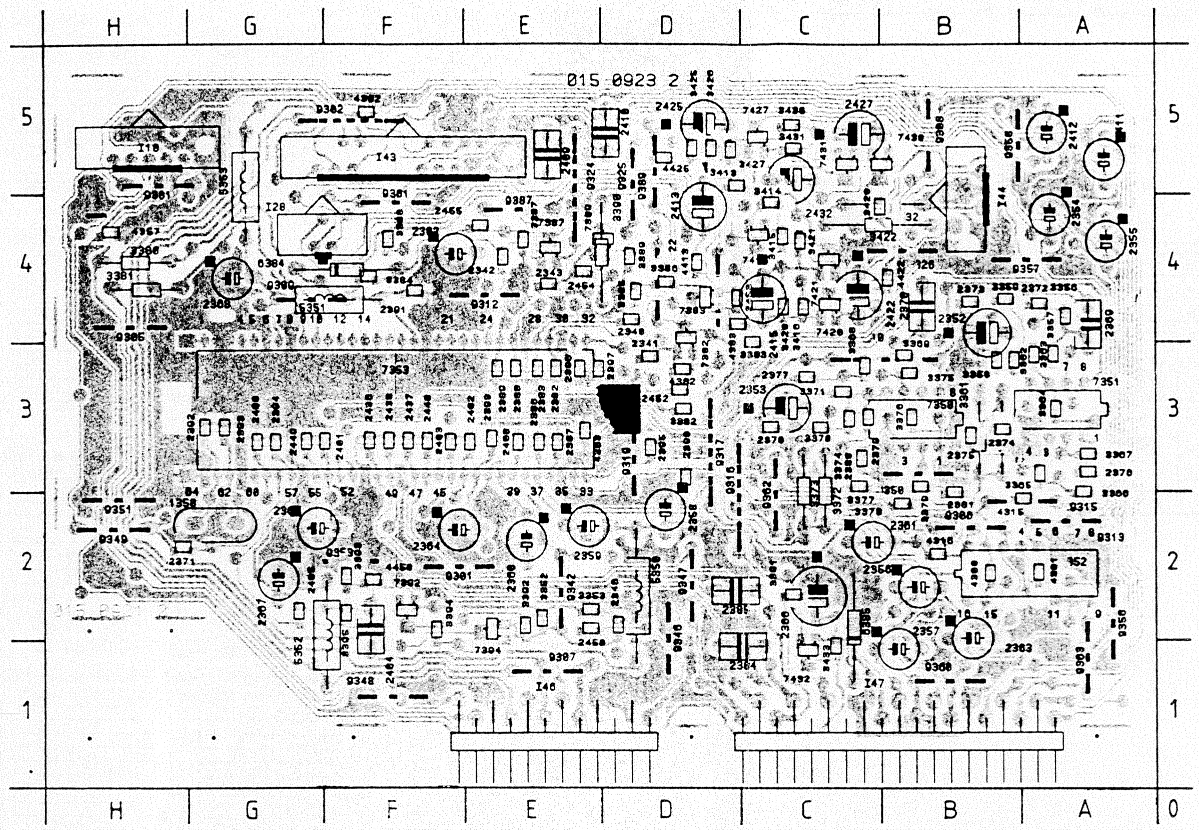


1V / div DC
0.2ms / div

→ = 0V

OSC_P2.CDR
260297

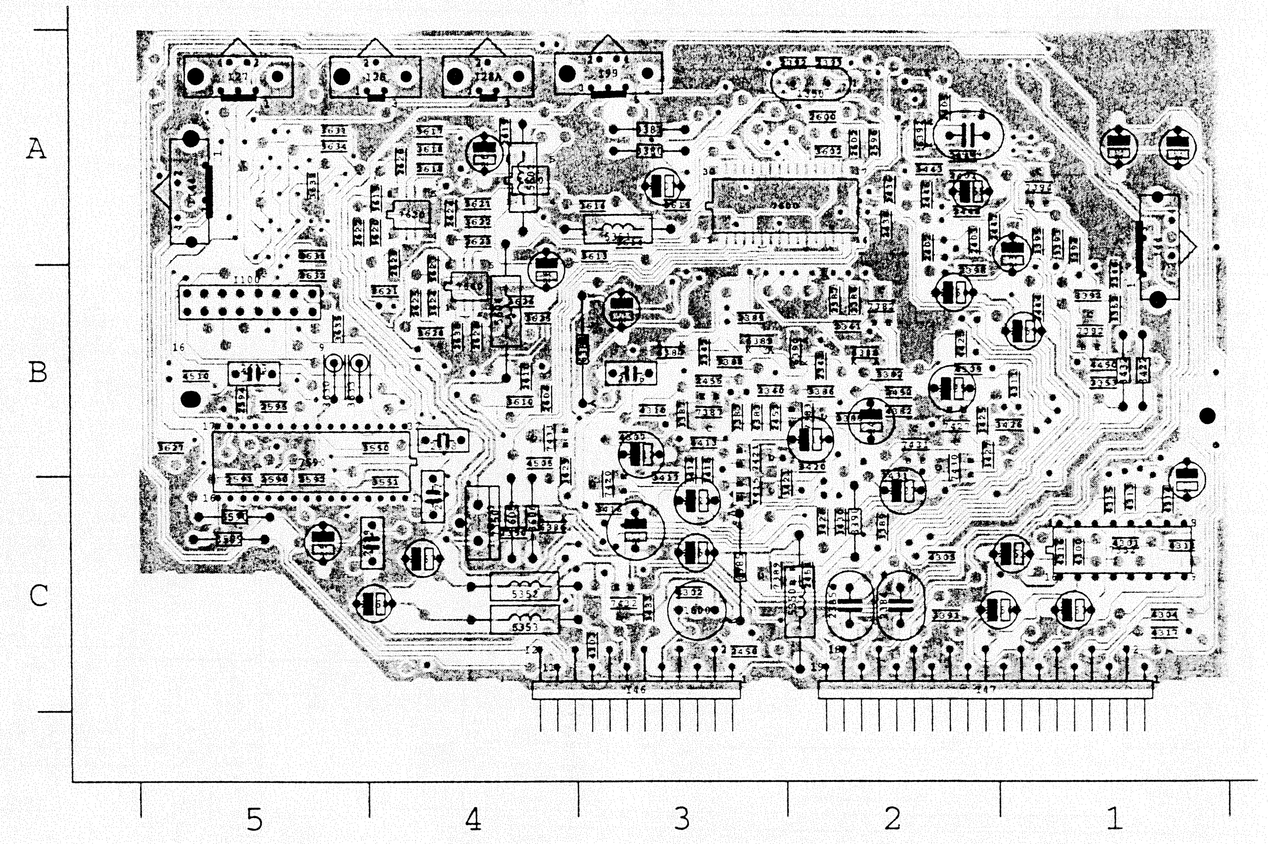
Audio module (no dolby) / Audio-Modul (kein Dolby) / Module Audio (non Dolby)



I28	G4	2360	E2	2379	C3*	2398	E3*	2437	F3*	3364	A3*	3383	C4*	3422	C4	4422	B4*	7415	C4*	9317	D3	9361	F5
I43	F5	2361	C2	2380	C3*	2400	G3*	2438	F3*	3365	A3*	3384	F4*	3425	D5*	4425	D5*	7420	C4*	9319	D3	9362	C3
I44	B5	2362	F4	2381	B3*	2401	G3*	2448	F3*	3366	A3*	3385	D4*	3426	D5*	4450	F2*	7421	C4*	9322	D4	9363	A1
I46	E1	2363	B2	2382	E3*	2402	E3*	2449	G3*	3367	A3*	3386	D4*	3427	D5*	5350	D2	7427	C5*	9323	D4	9380	H4
I47	B1	2364	F2	2383	E3*	2403	F3*	2450	E2*	3368	C3*	3387	E4*	3428	C5*	5351	F4	7430	C5*	9324	E5	9381	H5
1350	G2	2365	G2	2384	C2	2404	F2	2452	D3*	3369	B4*	3388	F4*	3430	C5*	5352	F2	7431	C5*	9325	D5	9387	E5
2340	D4*	2366	C2	2385	D2	2405	G2*	2453	D4*	3370	C3*	3389	D4*	3431	C5*	5353	G5	7432	C1*	9326	B4	9389	D5
2341	D3*	2367	G2	2386	E3*	2408	E3*	2454	E4*	3371	C3*	3390	E4	3432	B5	6384	F4	9301	F2	9342	E2		
2342	E4*	2368	G4	2387	E3*	2409	E5	2455	E4*	3372	C3	3391	C2*	3433	C1*	6385	C2	9302	F5	9346	D2		
2343	E4*	2369	A4	2388	E3*	2410	D5	3352	E2*	3373	C3	3392	E2*	4300	B2*	7350	B3	9305	H4	9347	D2		
2346	D2*	2370	B4	2389	E3*	2411	A5	3353	E2*	3374	C3*	3393	F2*	4301	A2*	7351	A3	9306	B2	9348	F1		
2352	B4	2371	H2*	2390	D3*	2412	A5	3356	A4*	3375	B3*	3394	F2*	4302	F5*	7352	A2	9307	E1	9349	H2		
2353	C3	2372	A4*	2391	F4*	2413	D5	3357	A4*	3376	B3*	3395	F2*	4303	E3*	7353	F3	9308	B5	9350	B3		
2354	A4	2373	B4*	2392	G3*	2415	C4	3358	B3*	3377	C3*	3413	D5*	4315	A3*	7382	D4*	9309	G4	9351	H3		
2355	A4	2374	B3*	2393	G3*	2422	C4	3359	B4*	3378	B2*	3414	C5*	4316	B2*	7383	D4*	9310	B3	9353	F2		
2356	B2	2375	B3*	2394	G3*	2425	D5	3360	B3	3379	B3*	3415	C4*	4357	H4*	7387	E4*	9312	E4	9356	A2		
2357	B1	2376	A3*	2395	D3*	2427	C5	3361	B3	3380	H4	3416	C4*	4382	D3*	7389	E4*	9313	A2	9357	A4		
2358	D2	2377	C3*	2396	E3*	2432	C5	3362	B3*	3381	H4	3420	C4*	4383	D4*	7392	F2*	9315	A3	9358	A5		
2359	E2	2378	C3*	2397	E3*	2436	F3*	3363	A4*	3382	D3*	3421	C4*	4413	D4*	7394	E2*	9316	D3	9360	B1		

* = SMD component

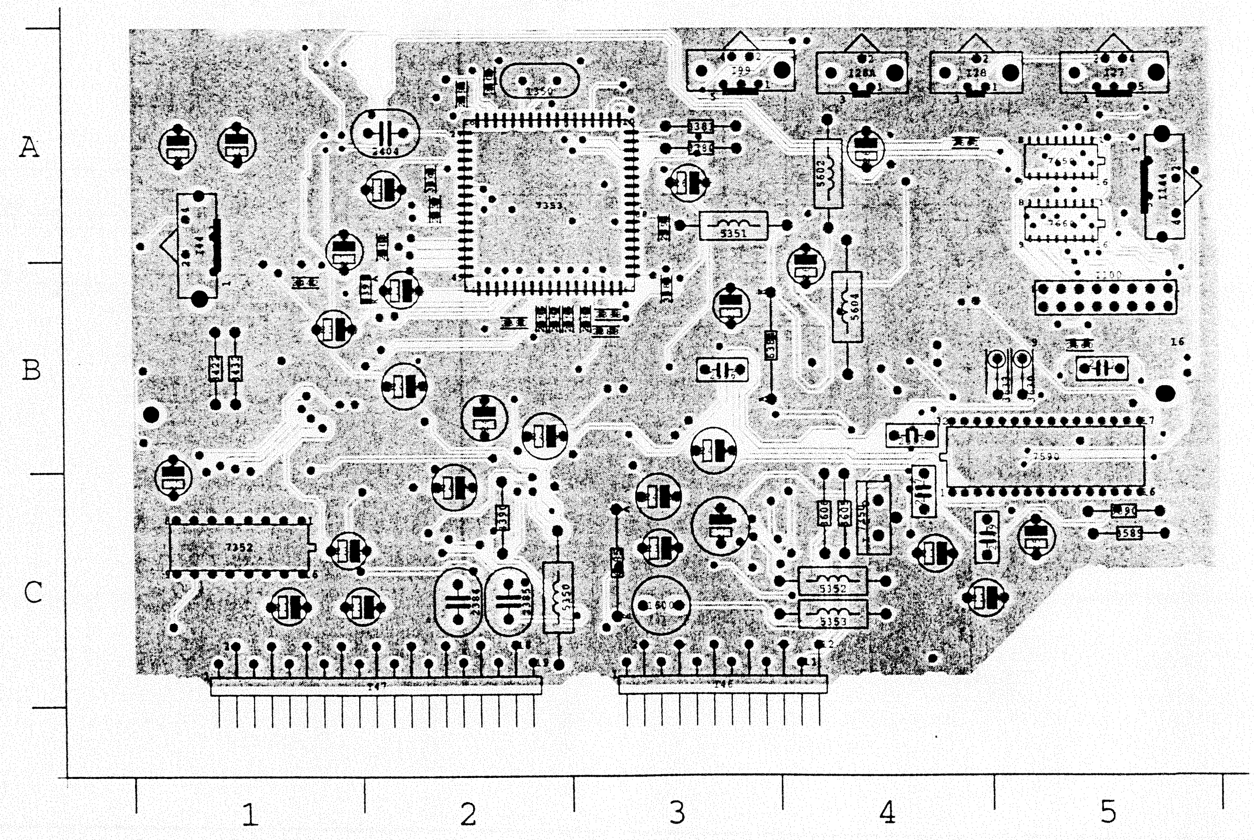
Dolby audio module / Dolby Audio module / Module audio Dolby



1350	A 2	2359	B 1	2387	B 2	2425	B 2	2455	B 3	2602	A 2	2627	B 4
1600	C 3	2360	B 2	2389	B 3	2427	C 2	2586	B 3	2604	B 4	2628	A 4
2340	B 3	2361	C 1	2392	A 2	2432	B 2	2587	C 4	2607	A 3	2629	A 4
2341	B 2	2362	B 3	2393	A 2	2436	A 2	2588	B 4	2610	B 4	2630	B 4
2342	B 3	2363	C 1	2398	B 2	2438	A 2	2589	C 4	2618	A 4	2631	A 5
2343	B 2	2364	B 1	2401	A 2	2446	A 2	2590	C 5	2619	A 4	2632	B 5
2346	B 1	2365	A 2	2402	A 2	2447	A 2	2591	C 5	2620	A 4	2633	B 5
2350	C 4	2366	C 3	2403	A 2	2448	A 2	2592	C 5	2621	B 4	3352	B 1
2354	A 1	2367	C 4	2404	A 2	2449	A 2	2593	C 5	2622	A 5	3353	B 1
2355	A 1	2368	C 4	2405	A 2	2450	C 3	2594	B 5	2623	A 4	3380	A 3
2356	C 1	2384	C 2	2413	B 3	2452	B 2	2595	B 5	2624	A 4	3381	A 3
2357	C 1	2385	C 2	2415	B 2	2453	B 3	2596	A 2	2625	B 4	3382	B 2
2358	C 3	2386	B 2	2422	C 3	2454	C 2	2600	A 2	2626	B 4	3383	B 3

3385	B 2	3415	B 3	3443	A 2	3616	A 3	3629	B 4	4307	B 3	4425	B 2
3386	B 2	3416	C 3	3444	B 1	3617	A 4	3630	B 5	4309	B 2	4450	B 1
3387	B 3	3420	B 2	3550	B 4	3618	A 4	3631	A 5	4310	B 3	4505	B 4
3388	B 3	3421	C 3	3551	C 4	3619	A 4	3632	A 5	4311	B 1	4510	B 5
3389	C 2	3422	B 1	3589	C 5	3620	A 4	3633	B 5	4312	C 1	5350	C 2
3390	C 2	3425	B 2	3590	C 5	3621	A 4	3634	A 5	4313	C 1	5351	A 3
3391	C 2	3426	B 1	3602	A 2	3622	A 4	3635	B 5	4314	C 1	5352	C 3
3392	B 1	3427	B 2	3605	C 4	3623	B 4	4300	C 1	4315	C 1	5353	C 3
3393	A 1	3428	C 2	3606	C 4	3624	B 4	4301	C 1	4316	C 1	5602	A 4
3394	A 1	3430	C 2	3610	B 4	3625	B 4	4302	C 3	4317	C 1	5604	B 4
3395	A 1	3431	B 2	3613	A 3	3626	B 4	4303	C 3	4382	B 2	6384	B 3
3413	B 3	3432	B 1	3614	A 3	3627	B 5	4304	C 1	4383	B 3	6385	C 3
3414	B 3	3433	C 3	3615	A 3	3628	B 4	4305	C 2	4413	B 3	6386	C 4

6387	B 3	7415	C 3	I27	A 5
6388	B 2	7420	C 3	I28	A 4
6389	B 3	7421	B 3	I28A	A 4
6390	B 2	7427	B 2	I44	B 1
6392	A 2	7430	B 2	I46	C 3
7350	C 4	7431	B 2	I47	C 1
7352	C 1	7432	C 3	I99	A 3
7382	B 2	7433	B 4	I100	B 5
7383	B 2	7590	C 4	I144	A 5
7387	B 3	7600	A 3		
7389	C 3	7610	A 4		
7392	B 1	7620	A 4		
7394	A 1	7640	B 4		



1350	A 2	2358	C 3	2364	B 1	2383	B 3	2394	A 2	2408	A 2	2432	B 2
1600	C 3	2359	B 1	2365	A 2	2384	C 2	2395	B 2	2413	B 3	2437	A 2
2354	A 1	2360	B 2	2366	C 3	2385	C 2	2396	B 2	2415	B 2	2586	B 3
2355	A 1	2361	C 1	2367	C 4	2388	B 3	2397	B 2	2422	C 3	2587	C 4
2356	C 1	2362	B 3	2368	C 4	2390	B 2	2400	A 2	2425	B 2	2588	B 4
2357	C 1	2363	C 1	2382	B 3	2391	A 3	2404	A 2	2427	C 2	2589	C 4

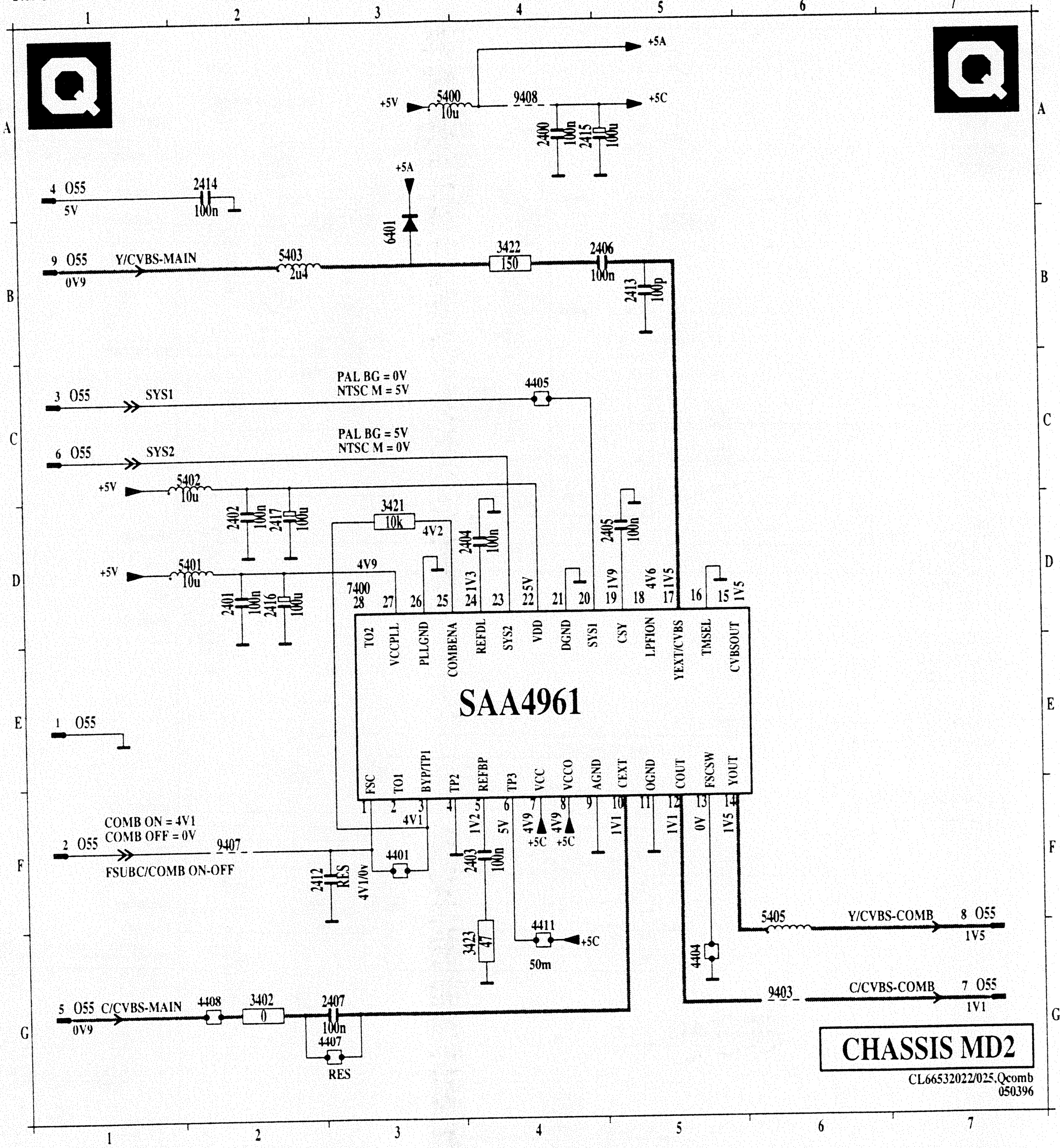
2593	C 5	2661	A 4	3432	B 1	3606	C 4	5353	C 3	7350	C 4	I27	A 5
2607	A 3	3380	A 3	3441	A 2	3630	B 5	5602	A 4	7352	C 1	I28	A 4
2627	B 4	3381	A 3	3442	B 1	3633	B 5	5604	B 4	7353	A 2	I28A	A 4
2628	A 4	3384	B 3	3589	C 5	5350	C 2	6384	B 3	7590	C 4	I44	B 1
2633	B 5	3390	C 2	3590	C 5	5351	A 3	6385	C 3	7650	A 5	I46	C 3
2660	B 5	3422	B 1	3605	C 4	5352	C 3	6391	B 2	7660	A 5	I47	C 1

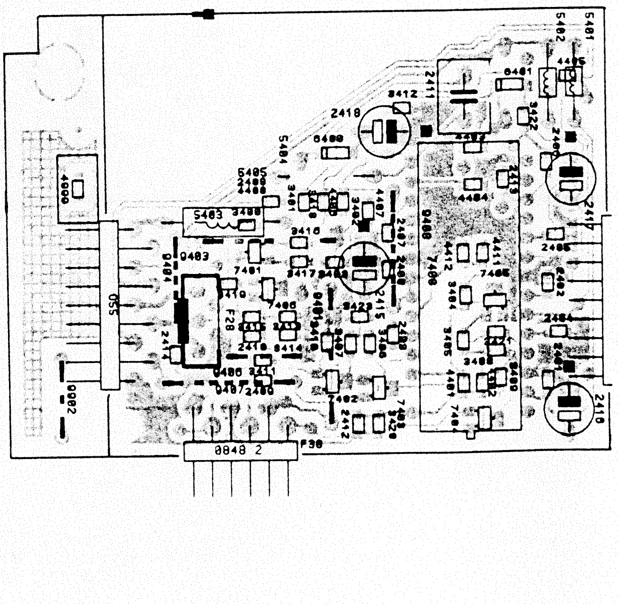
I99	A 3
I100	B 5
I144	A 5

34A

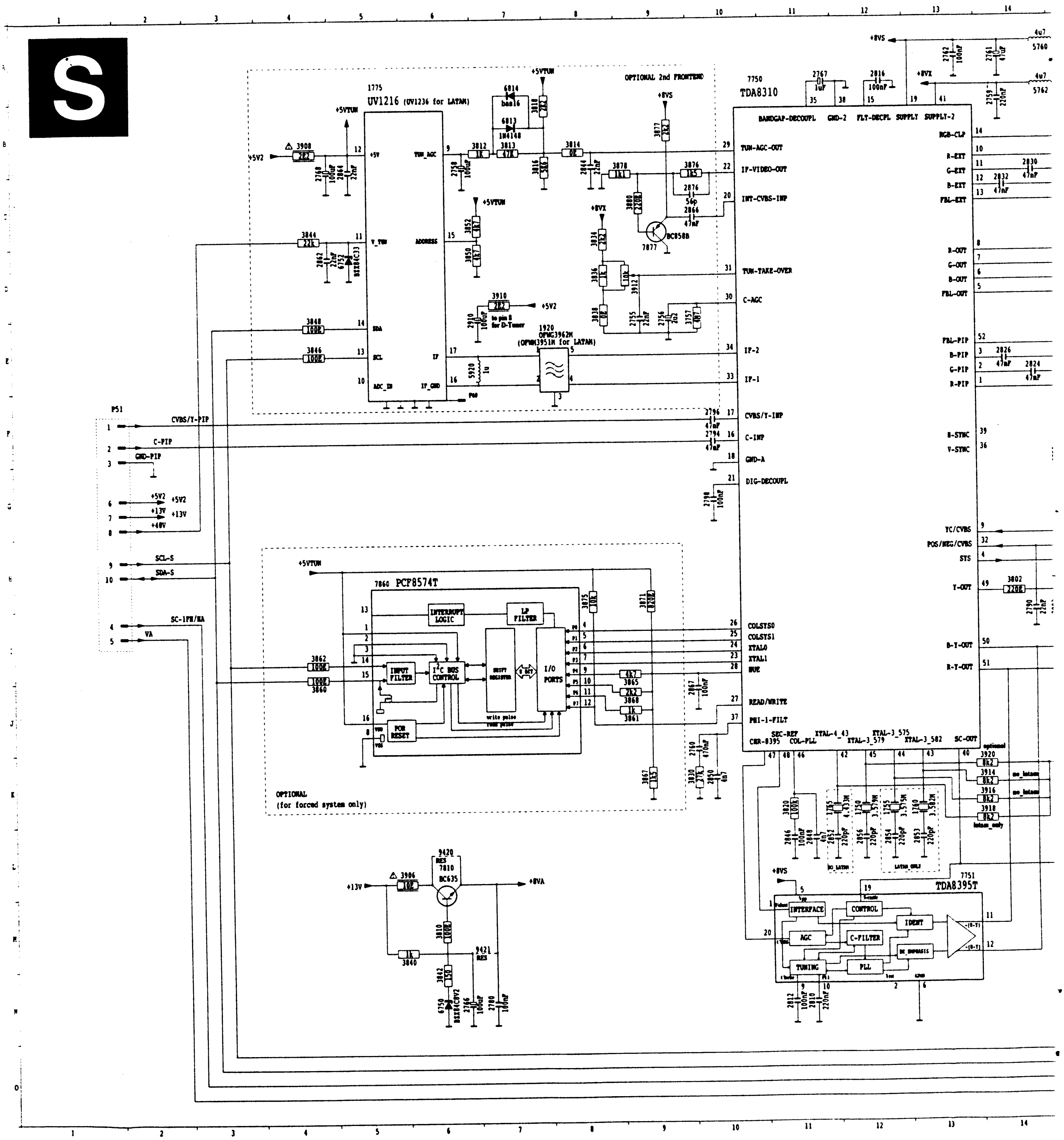
COMB filter module / Kammfilter-Modul / Module filtre en peigne

2400	A 4	2405	D 5	2414	A 2	3402	G 2	4404	G 5	5400	A 4	6401	B 3	9408	A 4	055	G 1
2401	D 2	2406	B 5	2415	A 4	3421	D 3	4405	C 4	5401	D 2	7400	D 3	055	E 1	055	C 1
2402	D 2	2407	G 3	2416	D 2	3422	B 4	4407	G 3	5402	C 2	9403	G 6	055	F 1	055	G 7
2403	F 4	2412	F 2	2417	D 2	3423	G 4	4408	G 2	5403	B 2	9406	E 1	055	C 1	055	F 7
2404	D 4	2413	B 5	3401	B 3	4401	F 3	4411	F 4	5405	F 6	9407	F 2	055	A 1	055	B 1


+5A
+5V
5400
10u
9408
+5C
2400 100n
2415 100u
4 055 5V
2414 100n
+5A
6401
9 055 0V9
Y/CVBS-MAIN
5403 2u4
3422 150
2406 100n
2413 100p
3 055
SYS1
PAL BG = 0V
NTSC M = 5V
4405
6 055
SYS2
PAL BG = 5V
NTSC M = 0V
+5V
5402 10u
2402 100n
2417 100u
3421 10k
4V2
2404 100n
2405 100n
+5V
5401 10u
2401 100n
2416 100u
4V9
7400
1V3
5V
1V9
4V6
1V5
1V5
TO2
VCCPLL
PLLGND
COMBENA
REFDL
SYS2
VDD
DGND
SYS1
CSY
LPFION
YEXT/CVBS
TMSEL
CVBSOUT
SAA4961
FSC
TO1
BYP/TP1
TP2
REFBP
TP3
VCC
VCCO
AGND
CEXT
OGND
COUT
FSCSW
YOUT
1 055
2 055
COMB ON = 4V1
COMB OFF = 0V
9407
FSUBC/COMB ON-OFF
2412 RES
4V1/0V
4401
4V1
1V2
2403 100n
5V
4V9 +5C
4V9 +5C
1V1
1V1
0V
1V5
3423 47
4411
50m
+5C
4404
5405
Y/CVBS-COMB
8 055
1V5
9403
C/CVBS-COMB
7 055
1V1
5 055 C/CVBS-MAIN
0V9
4408
3402 0
2407 100n
4407
RES
CHASSIS MD2
CL66532022/025.Qcomb
050396
1
2
3
4
5
6
7
A
B
C
D
E
F
G


055
0848 2
F30
5403
7400
2418
2417
2416

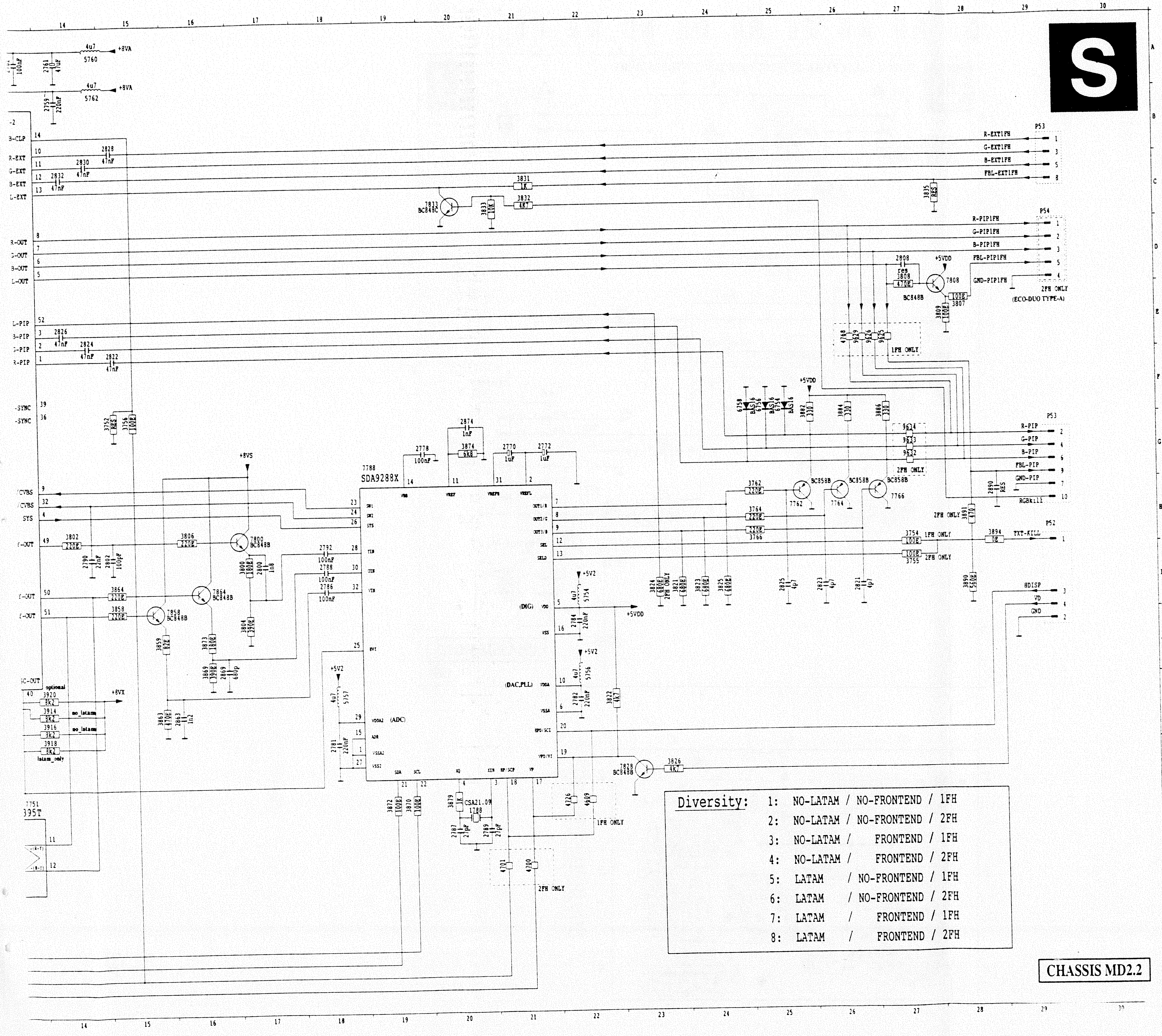
S


1775
UV1216 (UV1236 for LATAM)
+5VTUN
+5V2
3908 2R2
2760 100nF
2864 22nF
+5V
TUN_AGC
V_TUN
ADDRESS
SDA
SCL
IF
ADC_IN
IF_GND
6814 baa16
6813 1N4148
3812 1K
3813 47K
3818 2K2
3816 5K6
2758 100nF
3814 0R
2864 22nF
3878 1K1
3880 220R
3876 1K5
2876 56p
2866 47nF
BC858B
7877
3877 2K2
+8VS
+8VX
3834 2K2
3836 1K
3912 10K
3838 0R
2755 22nF
2756 2n2
3757 4K7
3852 4K7
3850 4K7
3844 22k
2862 22nF
6752 BZX84C33
3848 100R
3846 100R
3910 2R2
+5V2
2910 100nF
to pin 8 for D-Tuner
1920 OFWG3962M (OFWM3951M for LATAM)
5920 1u
OPTIONAL 2nd FRONTEND
7750 TDA8310
2767 1uF
2816 100nF
+8VS
+8VX
BANDGAP-DECOUPL
GND-2
FLT-DECPL
SUPPLY
SUPPLY-2
TUN-AGC-OUT
IF-VIDEO-OUT
INT-CVBS-INP
TUN-TAKE-OVER
C-AGC
IF-2
IF-1
CVBS/Y-INP
C-INP
GND-A
DIG-DECOUPL
COLSYS0
COLSYS1
XTAL0
XTAL1
HUE
READ/WRITE
PHI-1-FILT
SEC-REF
CHR-8395
COL-PLL
XTAL-4_43
XTAL-3_579
XTAL-3_575
XTAL-3_582
SC-OUT
RGB-CLP
R-EXT
G-EXT
B-EXT
FBL-EXT
R-OUT
G-OUT
B-OUT
FBL-OUT
FBL-PIP
B-PIP
G-PIP
R-PIP
H-SYNC
V-SYNC
YC/CVBS
POS/NEG/CVBS
STS
Y-OUT
B-Y-OUT
R-Y-OUT
2830 47nF
2832 47nF
2826 47nF
2824 47nF
3802 220R
2790 22nF
2762 100nF
2761 47uF
2759 220nF
4u7 5760
4u7 5762
2796 47nF
2794 47nF
2798 100nF
P51
CVBS/Y-PIP
C-PIP
GND-PIP
+5V2
+13V
+8V
SCL-S
SDA-S
SC-IPH/HA
VA
+5VTUN
7860 PCF8574T
INTERRUPT LOGIC
LP FILTER
INPUT FILTER
I²C BUS CONTROL
SHIFT REGISTER
8 BIT
I/O PORTS
write pulse
read pulse
POR RESET
VDD
VSS
3862 100R
3860 100R
3875 10K
3871 820R
3865 4K7
3868 2K2
3861 1k
3867 1K5
2867 100nF
2760 470nF
3830 27K
2850 4n7
OPTIONAL
(for forced system only)
optional
3920 8K2
3914 8K2
3916 8K2
3918 8K2
no_latam
latam_only
3820 100K
2846 100nF
2848 4n7
1755 4.433M
1750 3.579M
1755 3.575M
1760 3.582M
2852 220pF
2856 220pF
2854 220pF
2853 220pF
+8VS
7751 TDA8395T
INTERFACE
CONTROL
IDENT
AGC
C-FILTER
DE-EMPHASIS
TUNING
PLL
2812 100nF
2810 220nF
9420 RES
7810 BC635
3906 10R
+13V
+8VA
3810 100R
3840 1k
9421 RES
3842 150
6750 BZX84C8V2
2766 100nF
2780 100nF

PIP2-Modul

Module PIP2

S

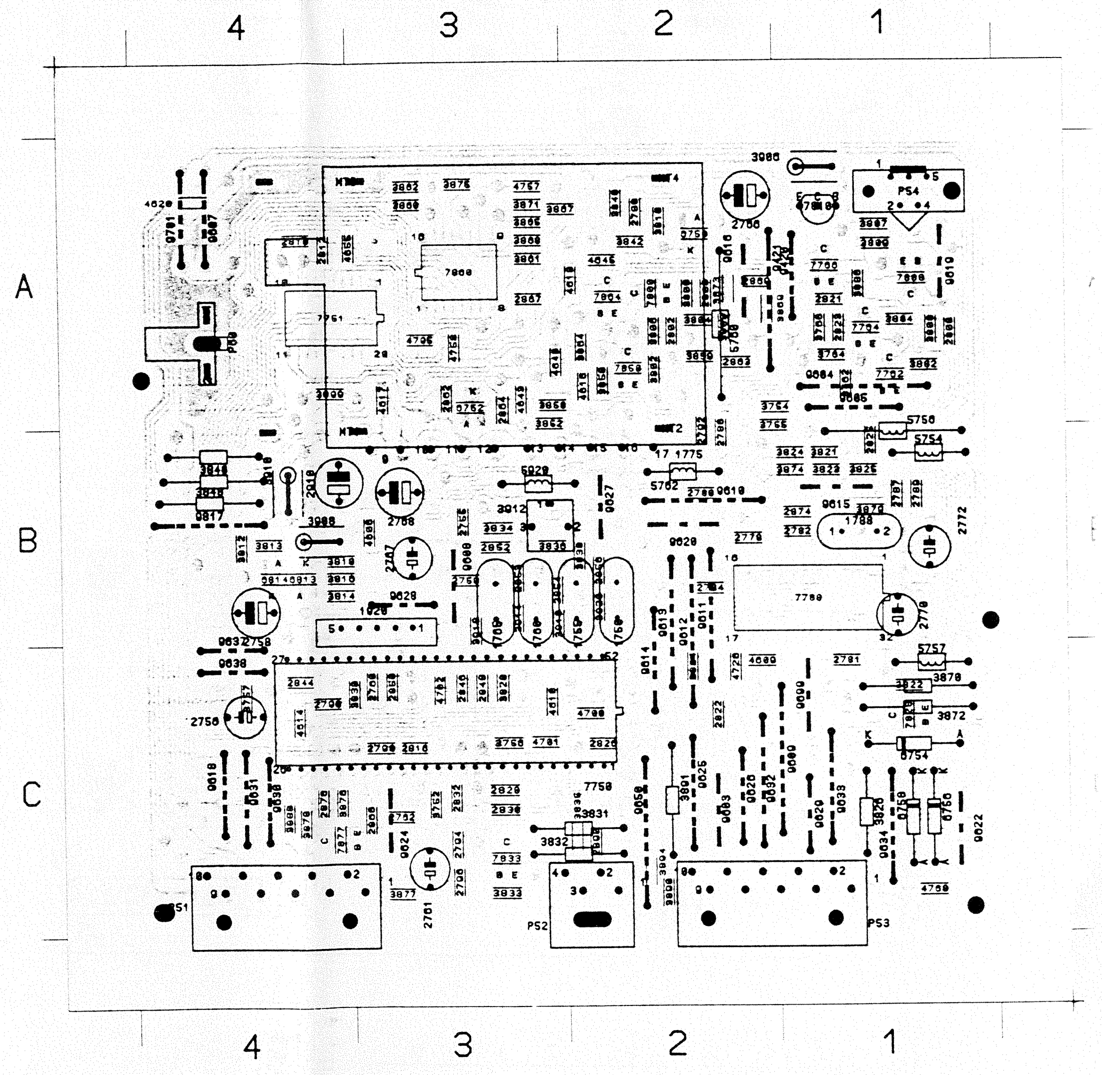

+8VA
5760
5762
4u7
R-EXT1FH
G-EXT1FH
B-EXT1FH
FBL-EXT1FH
P53
P54
R-PIP1FH
G-PIP1FH
B-PIP1FH
FBL-PIP1FH
GND-PIP1FH
2FH ONLY
(ECO-DUO TYPE-A)
1FH ONLY
7808
BC848B
7832
BC848C
+5VDD
R-PIP
G-PIP
B-PIP
FBL-PIP
GND-PIP
RGBkill
P52
TXT-KILL
8DISP
VD
GND
7788
SDA9288X
(ADC)
(DIG)
(DAC,PLL)
7762
7764
7766
BC858B
7802
7864
7858
BC848B
7828
BC848B
+5V2
+5VDD
+8VS
+8VX
CSA21.0MX
1788
7751
395T
optional
no_latam
latam_only
2FH ONLY
1FH ONLY

Diversity:
1: NO-LATAM / NO-FRONTEND / 1FH
2: NO-LATAM / NO-FRONTEND / 2FH
3: NO-LATAM / FRONTEND / 1FH
4: NO-LATAM / FRONTEND / 2FH
5: LATAM / NO-FRONTEND / 1FH
6: LATAM / NO-FRONTEND / 2FH
7: LATAM / FRONTEND / 1FH
8: LATAM / FRONTEND / 2FH

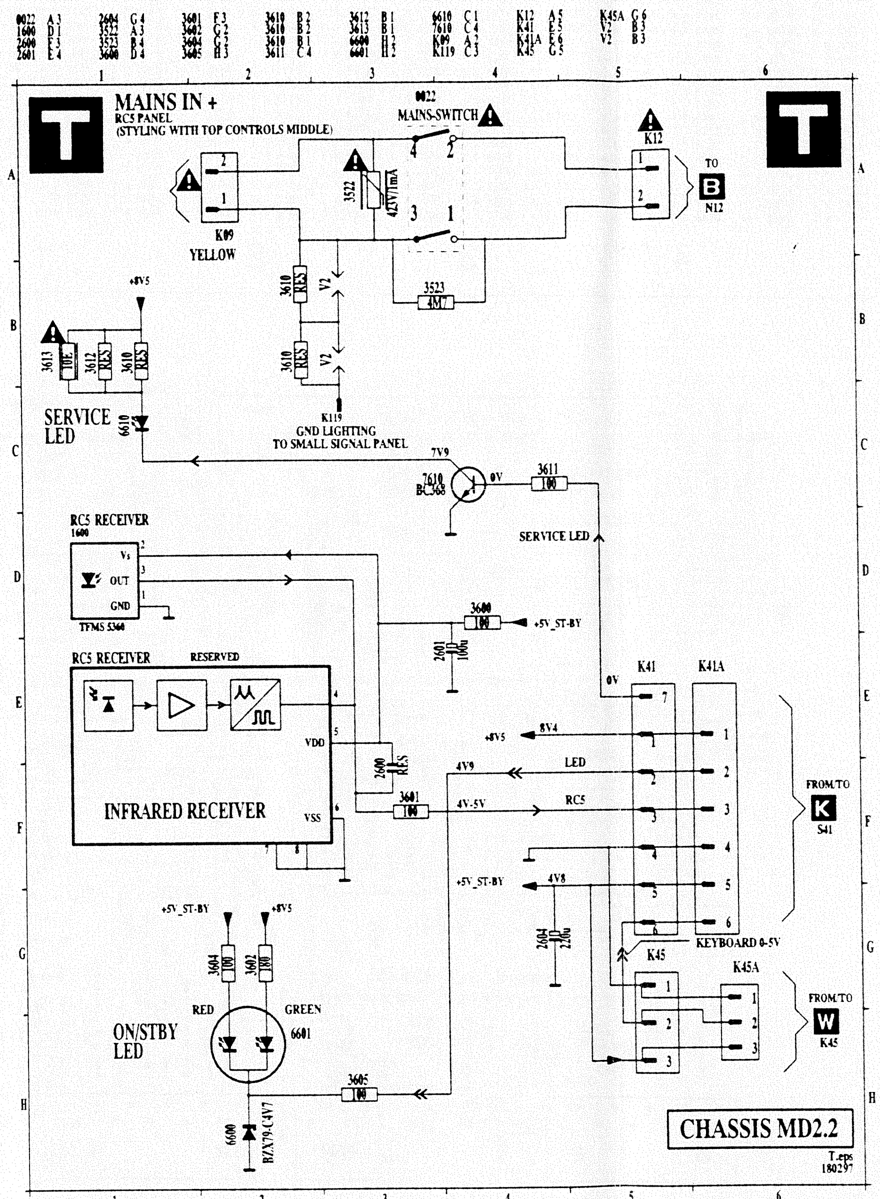
CHASSIS MD2.2

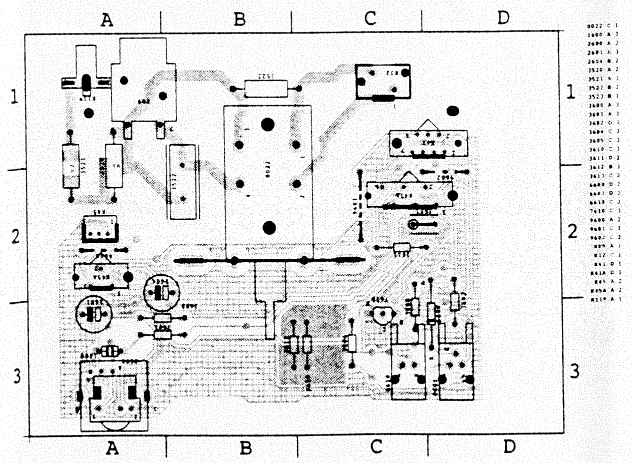
1750	K12
1755	K12
1760	K13
1765	K11
1775	A 5
1788	M20
1920	E 7
2755	E 9
2756	E 9
2758	B 6
2759	B14
2760	J10
2761	A14
2762	A13
2766	N 6
2767	A11
2768	B 4
2770	G21
2772	G21
2778	G19
2780	N 7
2781	K18
2782	K22
2784	J22
2786	I18
2787	M20
2788	I18
2789	M20
2790	I14
2792	H18
2794	F10
2796	F10
2798	G10
2800	I17
2802	I15
2808	D27
2810	N11
2812	N11
2816	A12
2821	I26
2822	E15
2823	I26
2824	E14
2825	I25
2826	E14
2828	B15
2830	B14
2832	C14
2844	B 8
2846	L11
2848	L11
2850	K10
2852	L11
2853	L13
2854	L12
2856	L12
2862	D 4
2863	K16
2864	B 5
2866	C10
2867	J10
2869	J16
2874	G20
2876	C10
2890	H28
2910	E 7
3752	F15
3754	H27
3755	I27
3756	F15
3757	E10
3762	H25
3764	H25
3766	H25
3800	I17
3802	H14
3804	J17
3806	H16
3807	E28
3808	D27
3809	E28
3810	M 6
3812	B 7
3813	B 7
3814	B 8
3816	B 7
3818	B 7
3820	K11
3821	I23
3822	K22
3823	I24
3824	I23
3825	I24
3826	L23
3830	K 9
3831	C21
3832	C21
3833	C21
3834	C 8
3835	C27
3836	D 8
3838	D 8
3840	M 5
3842	N 6
3844	C 4
3846	E 4
3848	E 4
3850	D 6
3852	C 6
3858	I15
3859	J15
3860	J 4
3861	J 9
3862	I 4
3863	K15
3864	I15
3865	J 9
3867	K 9
3868	J 9
3869	J16
3870	L19
3871	H 9
3872	L19
3873	J16
3874	G20
3875	H 8
3876	B10
3877	B 9
3878	B 9
3879	L20
3880	C 9
3882	F25
3884	F26
3886	F27
3890	I28
3891	H28
3894	H28
3906	L 5
3908	B 4
3910	D 7
3912	D 9
3914	K14
3916	K14
3918	K14
3920	K14
3999	J 1
4609	L22
4700	M21
4701	M21
4726	L22
4768	E26
5754	I22
5756	J22
5757	K18
5760	A14
5762	A14
5920	E 7
6750	N 6
6752	D 5
6754	F25
6756	F25
6758	F24
6813	B 7
6814	A 7
7750	A10
7751	L13
7762	H25
7764	H26
7766	H27
7788	G19
7800	H17
7808	E28
7810	L 6
7828	L23
7833	C20
7858	I15
7860	H 5
7864	I16
7877	D 9
9420	L 6
9421	M 7
9625	E27
9626	E27
9629	E26
9632	G27
9633	G27
9634	G27
PS1	F 2
PS2	H29
PS3	B29
PS3	G29
PS4	C29
P60	F 6

1750	B 2
1755	B 2
1760	B 3
1765	B 3
1775	B 3
1788	B 1
1920	B 3
2755	B 3
2756	C 4
2758	B 4
2759	B 3
2760	C 3
2761	C 3
2762	C 3
2766	A 2
2767	B 3
2768	B 3
2770	B 1
2772	B 1
2778	B 2
2780	A 2
2781	C 1
2782	B 1
2784	B 2
2786	B 2
2787	B 1
2788	B 2
2789	B 1
2790	C 4
2792	B 2
2794	C 3
2796	C 3
2798	C 3
2800	A 2
2802	A 2
2808	A 1
2810	A 4
2812	A 4
2816	C 3
2821	A 1
2822	C 2
2823	A 1
2824	C 2
2825	B 1
2826	C 2
2828	C 3
2830	C 3
2832	C 3
2844	C 4
2846	C 3
2848	C 3
2850	C 3
2852	B 3
2853	B 3
2854	B 3
2856	B 2
2862	A 3
2863	A 2
2864	A 3
2866	C 3
2867	A 3
2869	A 2
2874	B 1
2876	C 4
2890	C 2
2910	B 4
3752	C 3
3754	A 2
3755	A 2
3756	C 3
3757	C 4
3762	A 1
3764	A 1
3766	A 1
3800	A 2
3802	A 2
3804	A 2
3806	A 2
3807	A 1
3808	A 1
3809	A 1
3810	A 2
3812	B 4
3813	B 4
3814	B 4
3816	B 4
3818	B 4
3820	C 3
3821	B 1
3822	C 1
3823	B 1
3824	B 1
3825	B 1
3826	C 1
3830	C 4
3831	C 3
3832	C 3
3833	C 3
3834	B 3
3835	C 2
3836	B 3
3838	B 2
3840	A 2
3842	A 2
3844	B 4
3846	B 4
3848	B 4
3850	A 3
3852	A 3
3858	A 2
3859	A 2
3860	A 3
3861	A 3
3862	A 3
3863	A 2
3864	A 2
3865	A 3
3867	A 3
3868	A 3
3869	A 2
3870	C 1
3871	A 3
3872	C 1
3873	A 2
3874	B 1
3875	A 3
3876	C 4
3877	C 3
3878	C 4
3879	B 1
3880	C 4
3882	A 1
3884	A 1
3886	A 1
3890	C 2
3891	C 2
3894	C 2
3906	A 1
3908	B 4
3910	B 4
3912	B 2
3914	B 3
3916	B 3
3918	B 3
3920	B 2
3999	A 4
4606	B 3
4609	C 2
4610	C 3
4614	C 4
4616	A 2
4617	A 3
4618	A 2
4620	A 4
4640	A 3
4643	A 3
4645	A 2
4655	A 4
4700	C 2
4701	C 3
4702	C 3
4726	C 2
4757	A 3
4758	A 3
4768	C 1
4795	A 3
5754	B 1
5756	B 1
5757	C 1
5760	A 2
5762	B 2
5920	B 2
6750	A 2
6752	A 3
6754	C 1
6756	C 1
6758	C 1
6813	B 4
6814	B 4
7750	C 2
7751	A 4
7762	A 1
7764	A 1
7766	A 1
7788	B 1
7800	A 2
7808	A 1
7810	A 1
7828	C 1
7833	C 3
7858	A 2
7860	A 3
7864	A 2
7877	C 4
9420	A 1
9421	A 2
9603	C 2
9604	A 1
9605	A 1
9607	A 4
9608	B 3
9609	C 1
9610	B 2
9611	B 2
9612	B 2
9613	B 2
9614	B 2
9615	B 1
9616	A 2
9618	C 4
9619	A 1
9620	B 2
9622	C 1
9624	C 3
9625	C 2
9626	C 2
9627	B 2
9628	B 3
9629	C 1
9630	C 4
9631	C 4
9632	C 2
9633	C 1
9634	C 1
9637	C 4
9638	C 4
9650	C 2
9699	C 1
9701	A 4
9817	B 4
PS1	C 3
PS2	C 2
PS3	C 1
PS4	A 1
P60	A 4

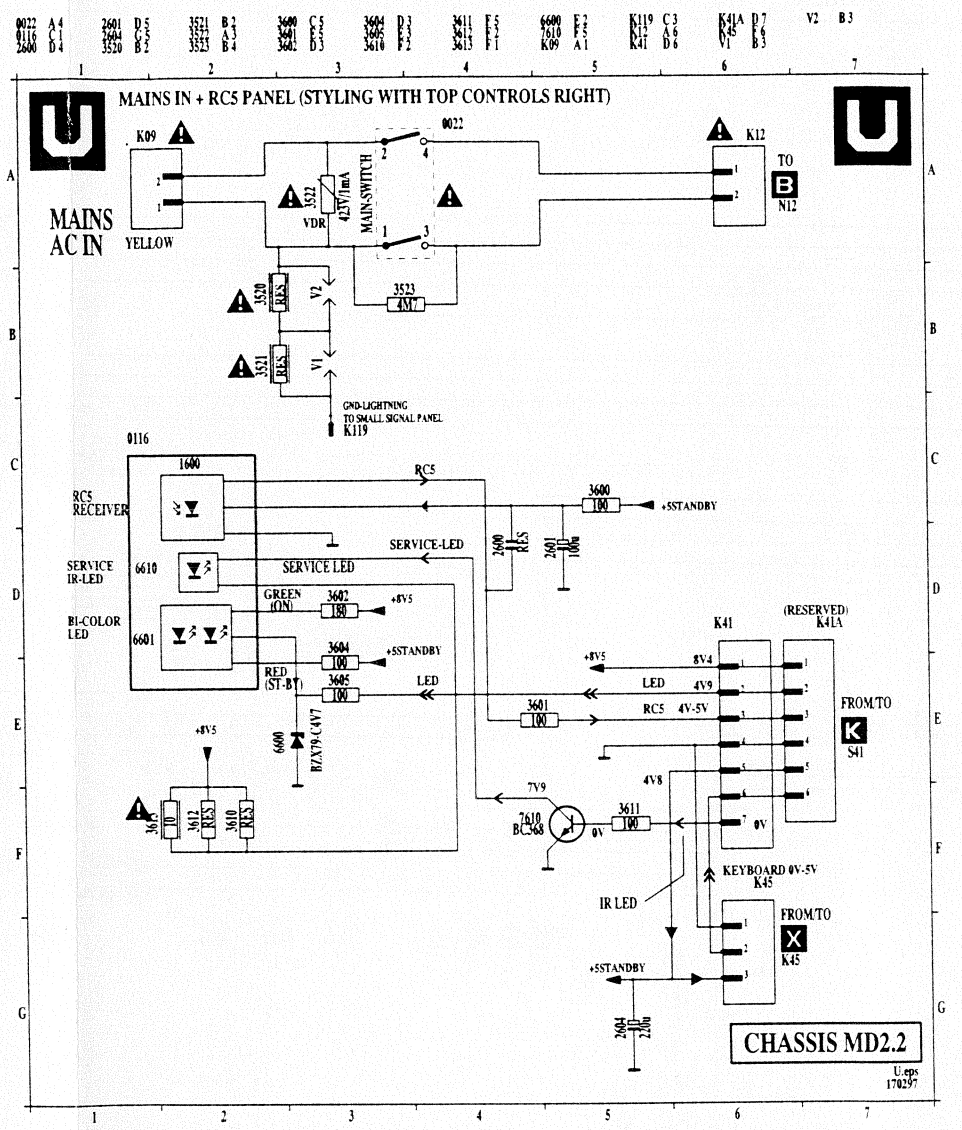

4
3
2
1
A
B
C
PS1
PS2
PS3
PS4
7750
7751
7860
3831
3832
2756
2768
2778
2772
2770

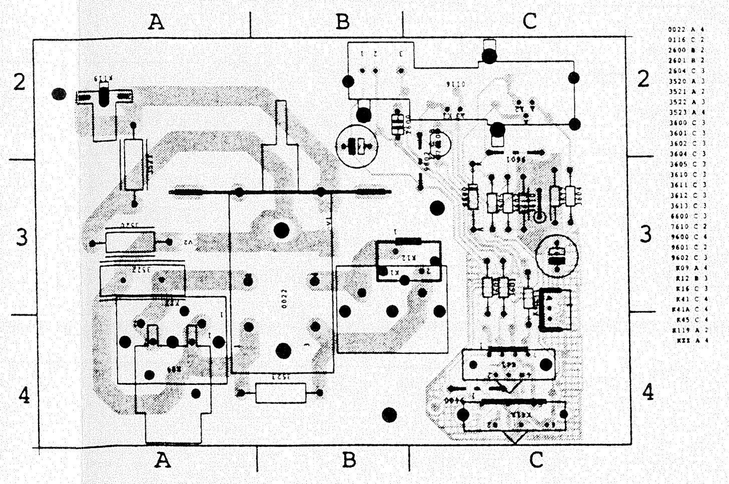
Mains input & RC5 panel (top control middle styling) / Netzeingang- & RC5-Platine (Bedienung mitte oben) / Platine entrée secteur & RC5 (style commande sur le haut, millieu)


T
MAINS IN +
RC5 PANEL
(STYLING WITH TOP CONTROLS MIDDLE)
0022
MAINS-SWITCH
K09
YELLOW
K12
TO
B
N12
3522
423V/1mA
3523
4M7
SERVICE LED
6610
K119
GND LIGHTING
TO SMALL SIGNAL PANEL
7610
BC368
3611
SERVICE LED
RC5 RECEIVER
1600
OUT
GND
TFMS 5360
RC5 RECEIVER
RESERVED
INFRARED RECEIVER
VDD
VSS
3600
+5V_ST-BY
2601
2600
3601
K41
K41A
+8V5
8V4
4V9
LED
4V-5V
RC5
+5V_ST-BY
4V8
FROM/TO
K
S41
KEYBOARD 0-5V
K45
K45A
FROM/TO
W
K45
2604
+5V_ST-BY
+8V5
3604
3602
RED
GREEN
6601
ON/STBY LED
3605
6600
BZX79-C4V7
CHASSIS MD2.2
T.eps
180297

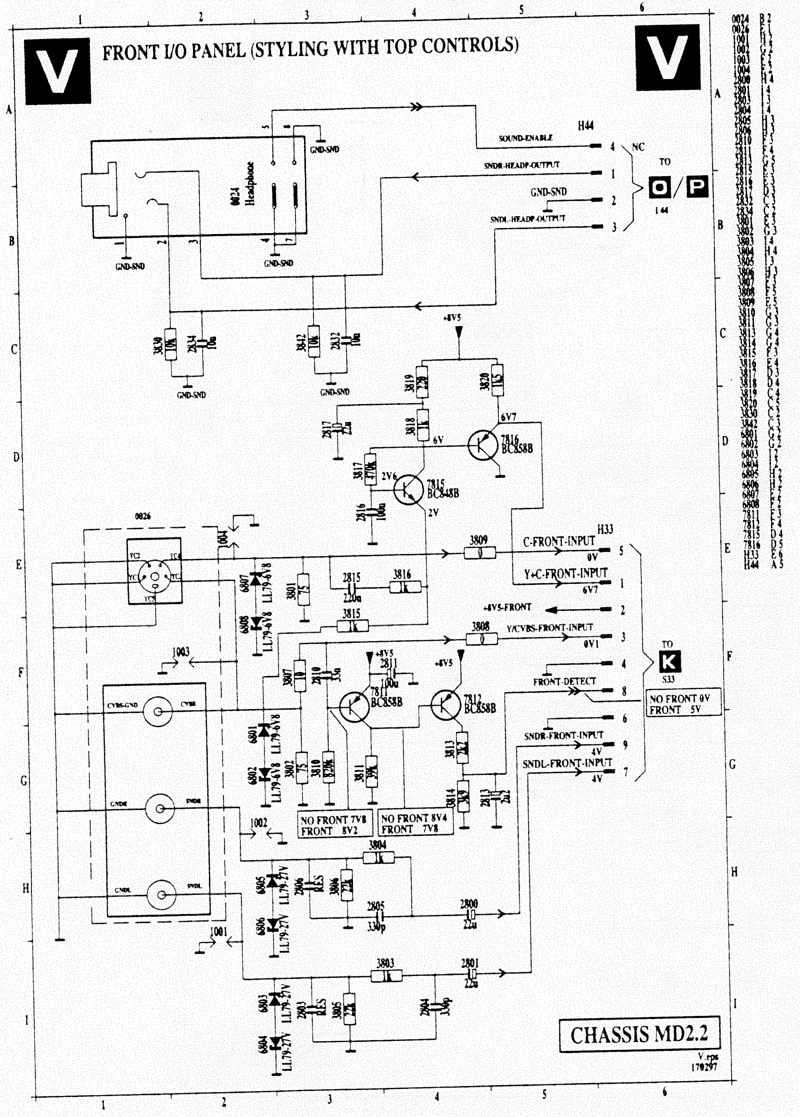


Mains input & RC5 panel (top control right styling) / Netzeingang- & RC5-Platine (Bedienung rechts oben) / Platine entrée secteur & RC5 (style commande sur le haut, droite)

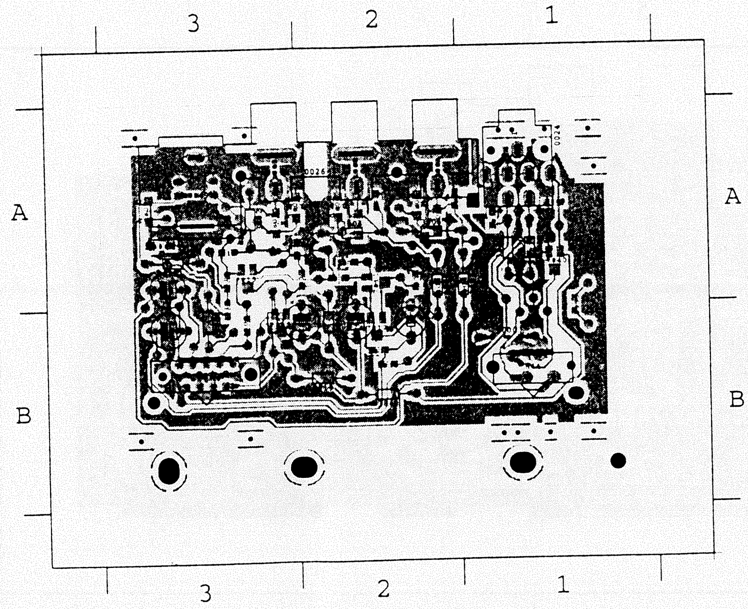

U
MAINS IN + RC5 PANEL (STYLING WITH TOP CONTROLS RIGHT)
K09
0022
MAINS-SWITCH
MAINS AC IN
YELLOW
VDR
3522
423V/1mA
3523
4M7
3520
3521
K12
TO
B
N12
GND-LIGHTING
TO SMALL SIGNAL PANEL
K119
0116
1600
RC5 RECEIVER
RC5
3600
+5STANDBY
SERVICE IR-LED
6610
SERVICE-LED
SERVICE LED
2600
2601
BI-COLOR LED
6601
GREEN (ON)
3602
+8V5
3604
+5STANDBY
RED (ST-BY)
3605
LED
6600
BZX79-C4V7
K41
(RESERVED)
K41A
+8V5
8V4
LED
4V9
RC5
4V-5V
3601
FROM/TO
K
S41
7610
BC368
3611
4V8
KEYBOARD 0V-5V
K45
IR LED
FROM/TO
X
K45
+5STANDBY
2604
CHASSIS MD2.2
U.eps
170297



Front input/output panel (top control styling) / Front-Ein-/Ausgangsplatine (Bedienung oben) / Platine frontale entrée/sortie (style commande sur le haut)

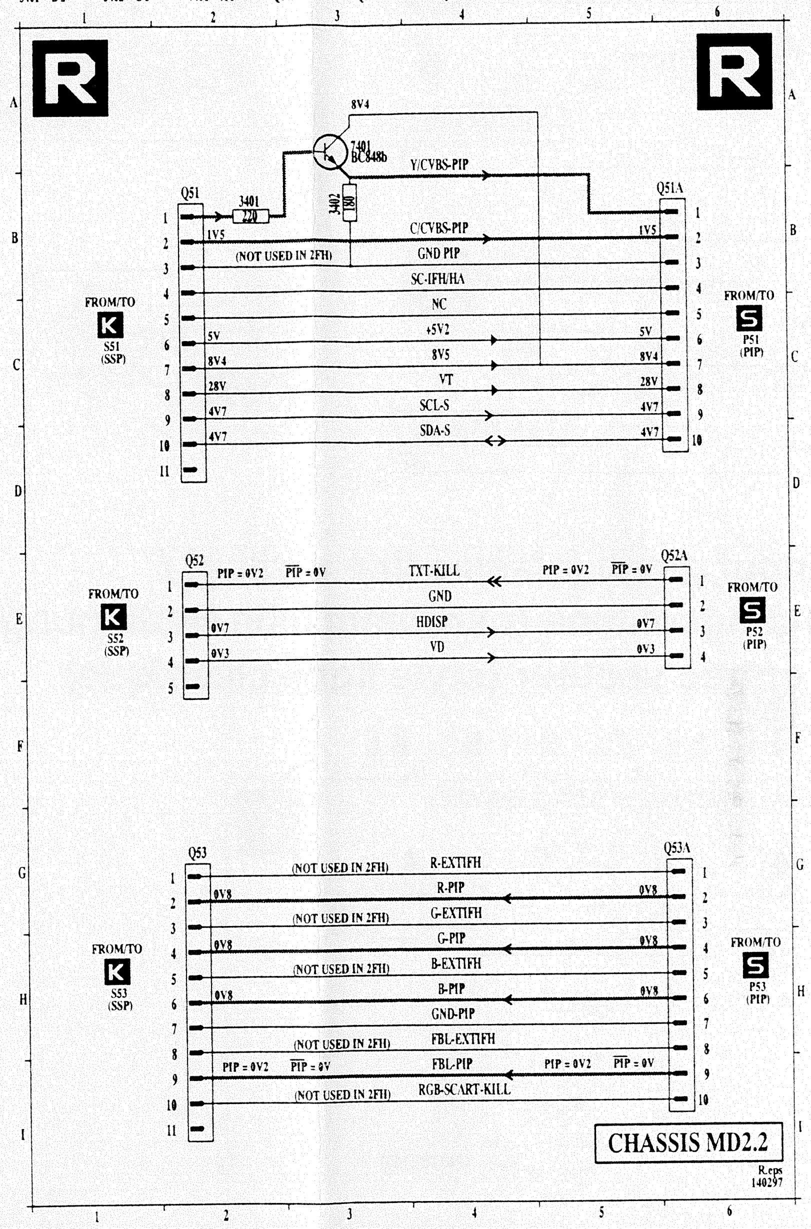

V
FRONT I/O PANEL (STYLING WITH TOP CONTROLS)
V
0024 Headphone
GND-SND
SOUND-ENABLE
SNDR-HEADP-OUTPUT
GND-SND
SNDL-HEADP-OUTPUT
H44
NC
TO
O/P
+4V5
6V7
7816 BC858B
7815 BC848B
2V6
2V
6V
3809
C-FRONT-INPUT
Y+C-FRONT-INPUT
+4V5-FRONT
Y/CVBS-FRONT-INPUT
FRONT-DETECT
SNDR-FRONT-INPUT
SNDL-FRONT-INPUT
H33
TO
K
S33
NO FRONT 0V
FRONT 5V
7811 BC858B
7812 BC858B
NO FRONT 7V8
FRONT 8V2
NO FRONT 8V4
FRONT 7V8
0026
1003
1002
1001
CVBS-GND
CVBS
SNDR
SNDL
CHASSIS MD2.2
V.eps
170297
1
2
3
4
5
6
A
B
C
D
E
F
G
H
I

0024	A	1
0026	A	3
2800	B	3
2801	A	3
2803	A	2
2804	A	1
2805	A	2
2806	A	2
2810	A	2
2811	B	2
2813	B	2
2815	B	3
2816	A	2
2817	B	2
2832	A	1
2834	A	1
2840	A	1
3801	A	3
3802	A	3
3803	A	1
3804	A	2
3805	A	2
3806	A	2
3807	A	3
3808	B	3
3809	A	3
3810	A	2
3811	A	2
3813	B	2
3814	B	2
3815	A	3
3816	A	3
3817	A	2
3818	A	2
3819	B	2
3820	A	3
3830	A	1
3840	B	2
3842	A	1
3999	B	1
6801	A	3
6802	A	2
6803	A	2
6804	A	2
6805	A	2
6806	A	2
6807	A	3
6808	A	3
7811	A	2
7812	B	2
7815	A	3
7816	B	3
7840	A	1
9000	B	1
H33	B	3
H44	B	1

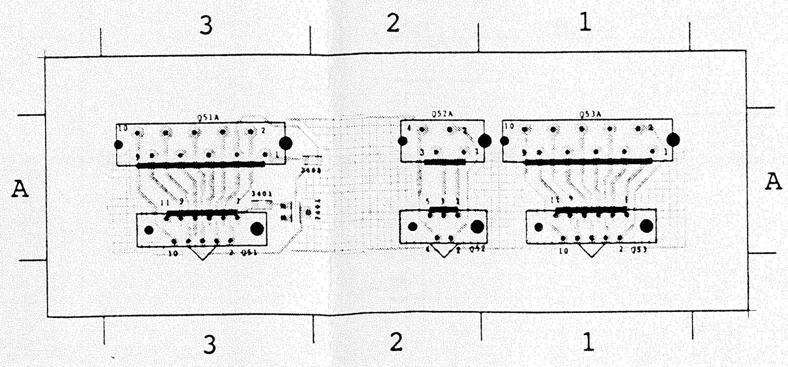

3
2
1
A
B
A
B
3
2
1

PIP interface panel / PIP-Schnittstellenplatine / Platine interface PIP (image incrustée)

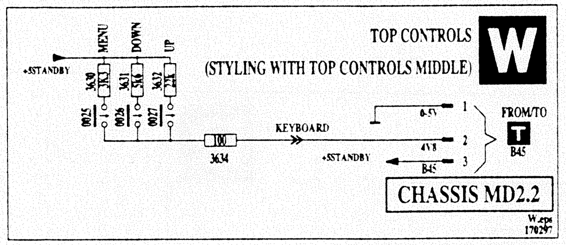
3401	B	2
3402	B	3
7401	A	3
Q51	B	2
Q51A	B	6
Q52	E	2
Q52A	E	6
Q53	G	2
Q53A	G	6

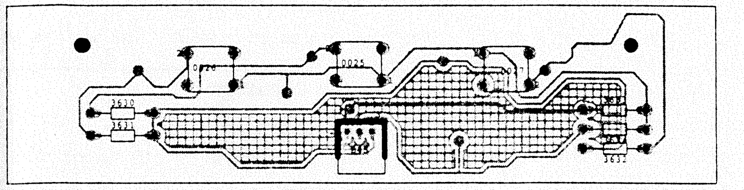

R
R
8V4
7401 BC848b
Y/CVBS-PIP
Q51
3401 220
3402 100
Q51A
1V5
C/CVBS-PIP
(NOT USED IN 2FH)
GND PIP
SC-IFH/HA
NC
+5V2
8V5
VT
SCL-S
SDA-S
5V
8V4
28V
4V7
FROM/TO
K
S51 (SSP)
FROM/TO
S
P51 (PIP)
Q52
Q52A
PIP = 0V2
PIP = 0V
TXT-KILL
GND
HDISP
VD
0V7
0V3
FROM/TO
K
S52 (SSP)
FROM/TO
S
P52 (PIP)
Q53
Q53A
(NOT USED IN 2FH)
R-EXTIFH
R-PIP
G-EXTIFH
G-PIP
B-EXTIFH
B-PIP
GND-PIP
FBL-EXTIFH
FBL-PIP
RGB-SCART-KILL
0V8
FROM/TO
K
S53 (SSP)
FROM/TO
S
P53 (PIP)
CHASSIS MD2.2
R.eps
140297
1
2
3
4
5
6
A
B
C
D
E
F
G
H
I

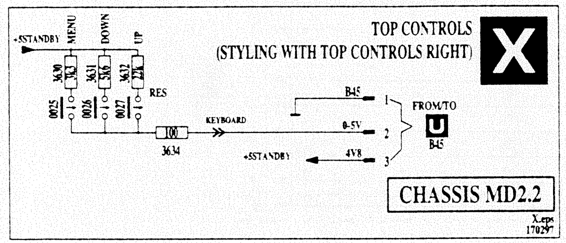
3401	A	3
3402	A	2
7401	A	3
Q51	A	3
Q51A	A	3
Q52	A	2
Q52A	A	2
Q53	A	1
Q53A	A	1

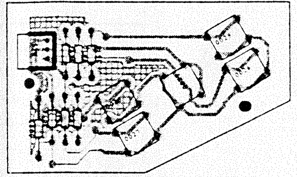

3
2
1
A
A
Q51A
Q52A
Q53A
Q51
Q52
Q53
3401
3402
3
2
1

Top control panel / Obere bedienungsplatine / Platine supérieure de commande

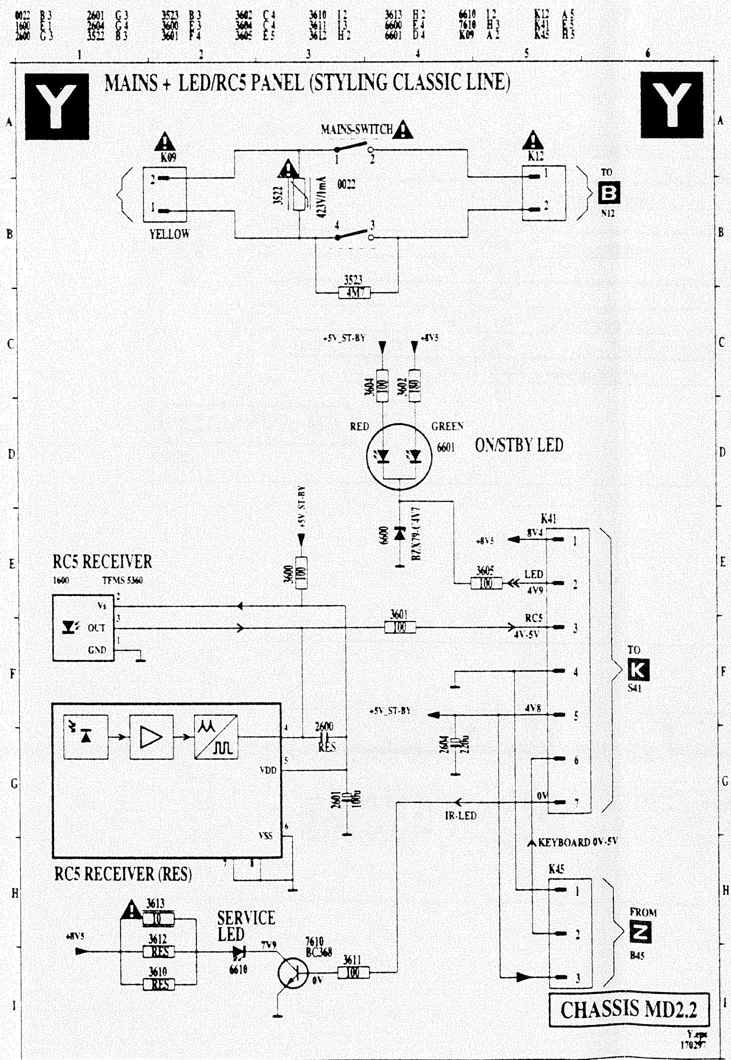

TOP CONTROLS
(STYLING WITH TOP CONTROLS MIDDLE)
W
+5STANDBY
MENU
DOWN
UP
KEYBOARD
0-5V
4V8
B45
FROM/TO
T
B45
3634
CHASSIS MD2.2
W.eps
170297

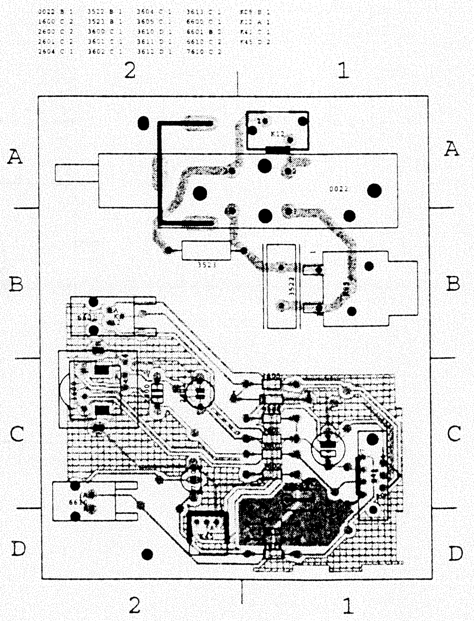



TOP CONTROLS
(STYLING WITH TOP CONTROLS RIGHT)
X
+5STANDBY
MENU
DOWN
UP
RES
KEYBOARD
B45
0-5V
4V8
FROM/TO
U
B45
3634
CHASSIS MD2.2
X.eps
170297

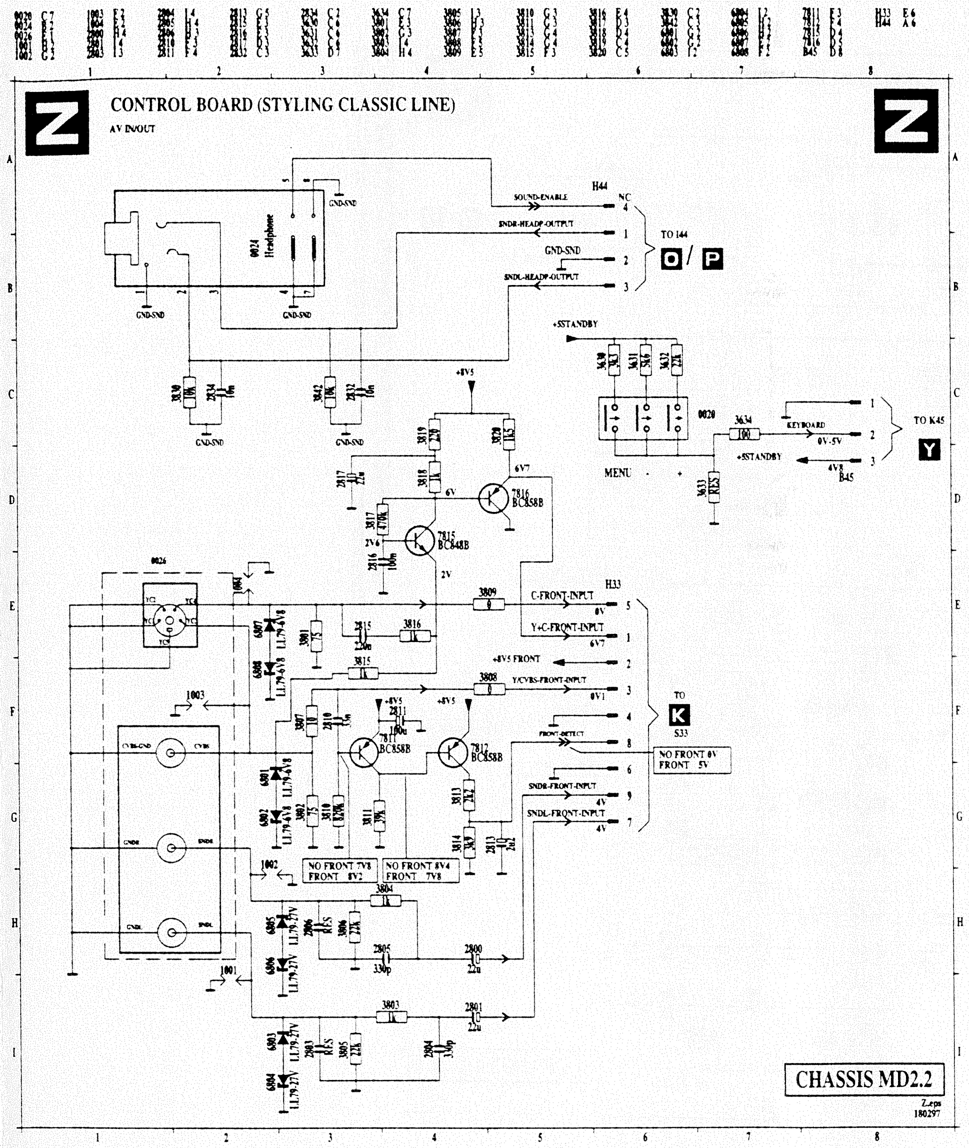


Mains input panel (classic line styling) / Netzeingangsplatine (herkömmliche Bedienung) / Platine entrée secteur (style ligne classique)

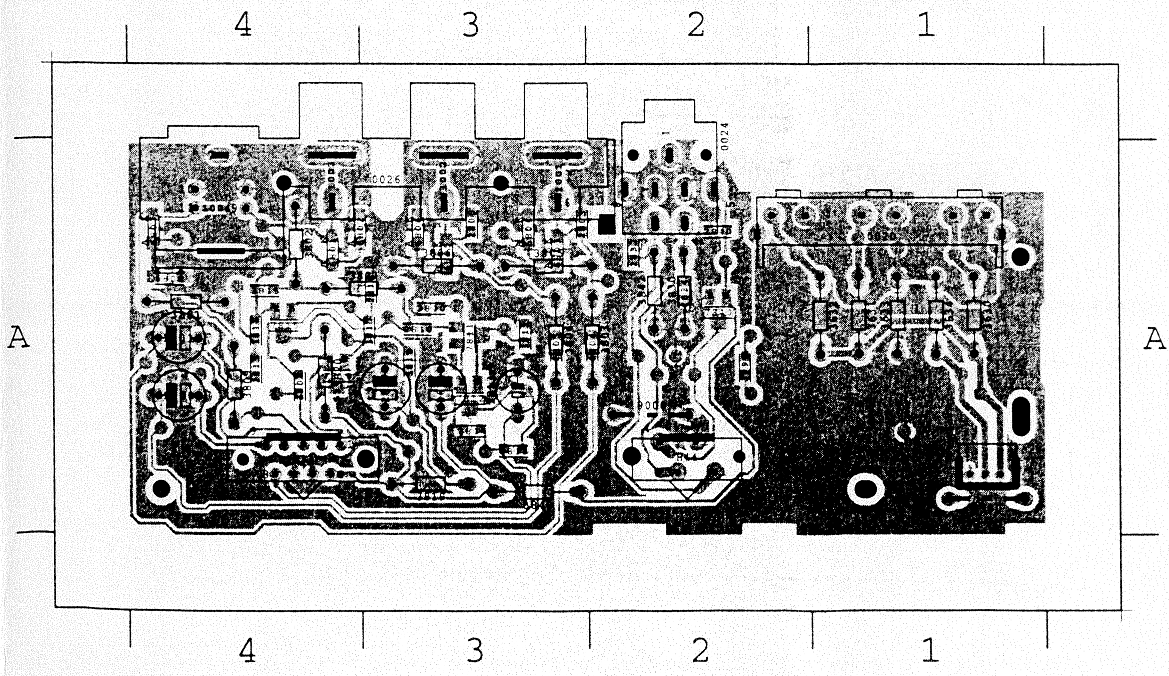

Y
MAINS + LED/RC5 PANEL (STYLING CLASSIC LINE)
MAINS-SWITCH
K09
YELLOW
3522
0022
K12
TO
B
N12
+5V_ST-BY
+8V5
RED
GREEN
6601
ON/STBY LED
RC5 RECEIVER
TFMS 5360
OUT
GND
K41
LED
RC5
TO
K
S41
RC5 RECEIVER (RES)
VDD
VSS
IR-LED
KEYBOARD 0V-5V
K45
FROM
Z
B45
SERVICE LED
7610
BC368
6610
CHASSIS MD2.2
Y.eps
170297

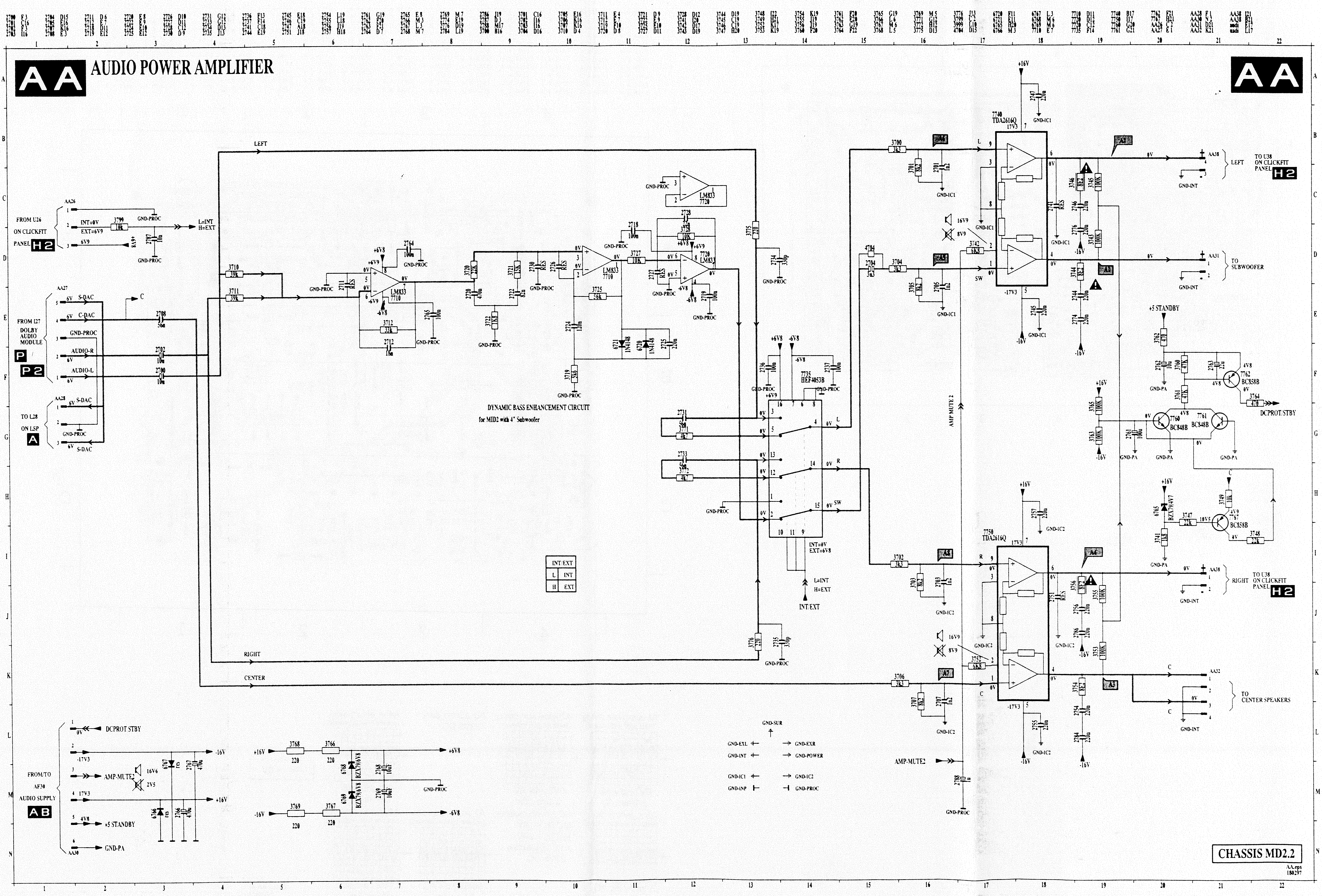


Control board (classic line styling) / Steuerplatine (herkömmliche Bedienung) / Tableau de commande (style ligne classique)

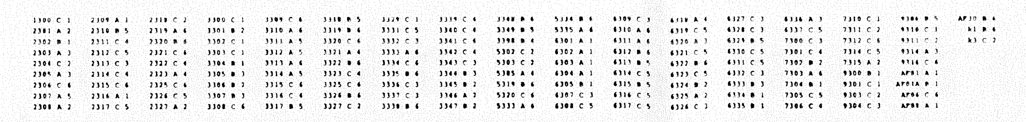

Z
CONTROL BOARD (STYLING CLASSIC LINE)
AV IN/OUT
H44
SOUND-ENABLE
SNDR-HEADP-OUTPUT
GND-SND
SNDL-HEADP-OUTPUT
TO H44
O / P
Headphone
+5STANDBY
MENU
KEYBOARD
0V-5V
4V8
B45
TO K45
Y
7816
BC858B
7815
BC848B
H33
C-FRONT-INPUT
Y+C-FRONT-INPUT
+8V5 FRONT
Y/CVBS-FRONT-INPUT
TO
K
S33
NO FRONT 0V
FRONT 5V
SNDR-FRONT-INPUT
SNDL-FRONT-INPUT
7811
BC858B
7812
BC858B
NO FRONT 5V8
FRONT 0V2
NO FRONT 8V4
FRONT 5V8
CHASSIS MD2.2
Z.eps
180297
1
2
3
4
5
6
7
8

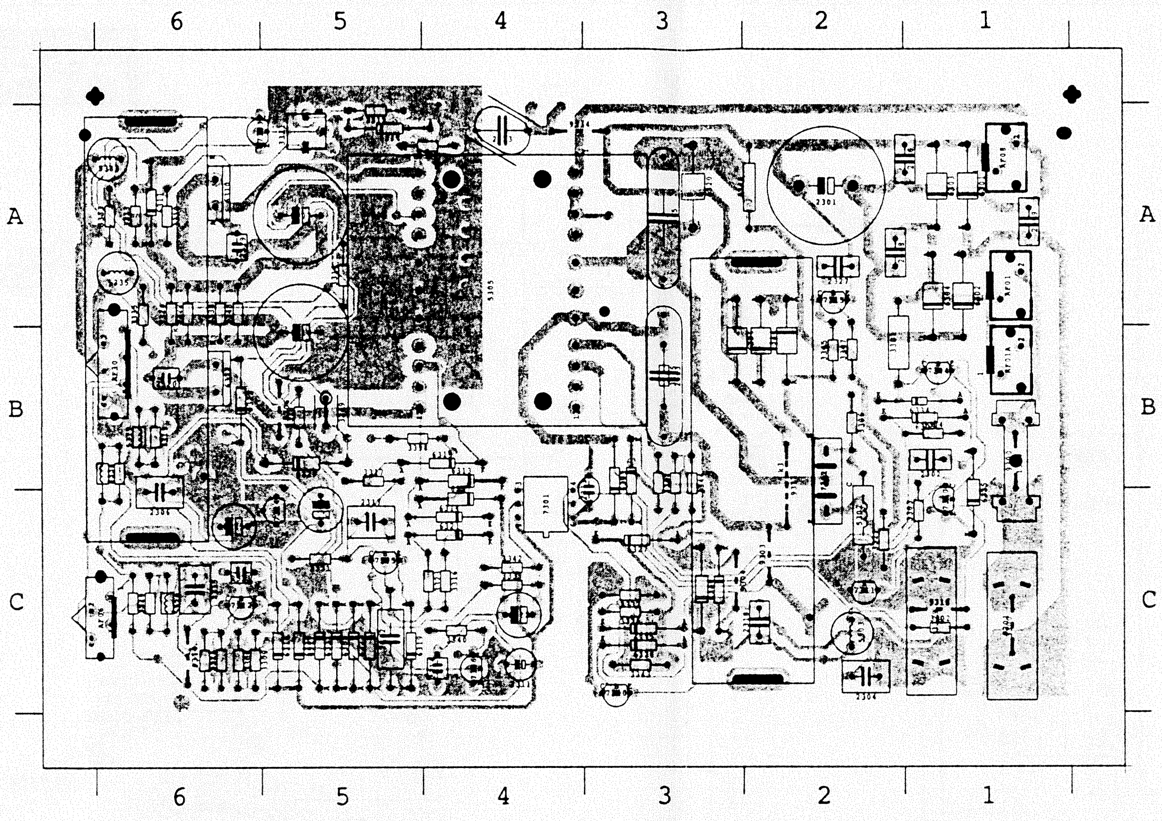
0020 A 2	2803 A 3	2811 A 3	2832 A 2	3632 A 1	3803 A 2	3808 A 4	3814 A 3	3819 A 3	3999 A 2	6805 A 3	7812 A 3	9900 A 1
0024 A 2	2804 A 2	2813 A 3	2834 A 2	3633 A 1	3804 A 3	3809 A 4	3815 A 4	3820 A 4	6801 A 4	6806 A 3	7815 A 4	B45 A 1
0026 A 4	2805 A 3	2815 A 4	2840 A 2	3634 A 1	3805 A 3	3810 A 3	3816 A 4	3830 A 2	6802 A 4	6807 A 4	7816 A 4	H33 A 4
2800 A 4	2806 A 3	2816 A 3	3630 A 1	3801 A 4	3806 A 3	3811 A 3	3817 A 3	3840 A 3	6803 A 3	6808 A 4	7840 A 2	H44 A 2
2801 A 4	2810 A 3	2817 A 3	3631 A 1	3802 A 4	3807 A 4	3813 A 3	3818 A 3	3842 A 2	6804 A 3	7811 A 3	9000 A 2	


4
3
2
1
A
0024
0026


AA
AUDIO POWER AMPLIFIER
AA
FROM U26 ON CLICKFIT PANEL
H2
INT=0V
EXT=6V9
L=INT
H=EXT
FROM I27 DOLBY AUDIO MODULE
P
P2
S-DAC
C-DAC
GND-PROC
AUDIO-R
AUDIO-L
TO L28 ON LSP
A
LEFT
RIGHT
CENTER
LM833
7710
7720
TDA2616Q
7740
7750
HEF4053B
7735
DYNAMIC BASS ENHANCEMENT CIRCUIT
for MD2 with 4" Subwoofer
INT EXT
L INT
H EXT
INT=0V
EXT=6V8
L=INT
H=EXT
INT/EXT
AMP MUTE 2
TO U38 ON CLICKFIT PANEL
LEFT
TO SUBWOOFER
RIGHT
TO CENTER SPEAKERS
+5 STANDBY
BC858B
BC848B
DCPROT/STBY
BZX79/4V7
+16V
-16V
+6V8
-6V8
FROM/TO AF30 AUDIO SUPPLY
AB
DCPROT STBY
AMP-MUTE2
+5 STANDBY
GND-PA
BZX79/6V8
GND-SUR
GND-EXL
GND-EXR
GND-INT
GND-POWER
GND-IC1
GND-IC2
GND-INP
GND-PROC
AMP-MUTE2
CHASSIS MD2.2
AA.eps
180297

Audio amplifier panel / Tonverstärker-Platine /





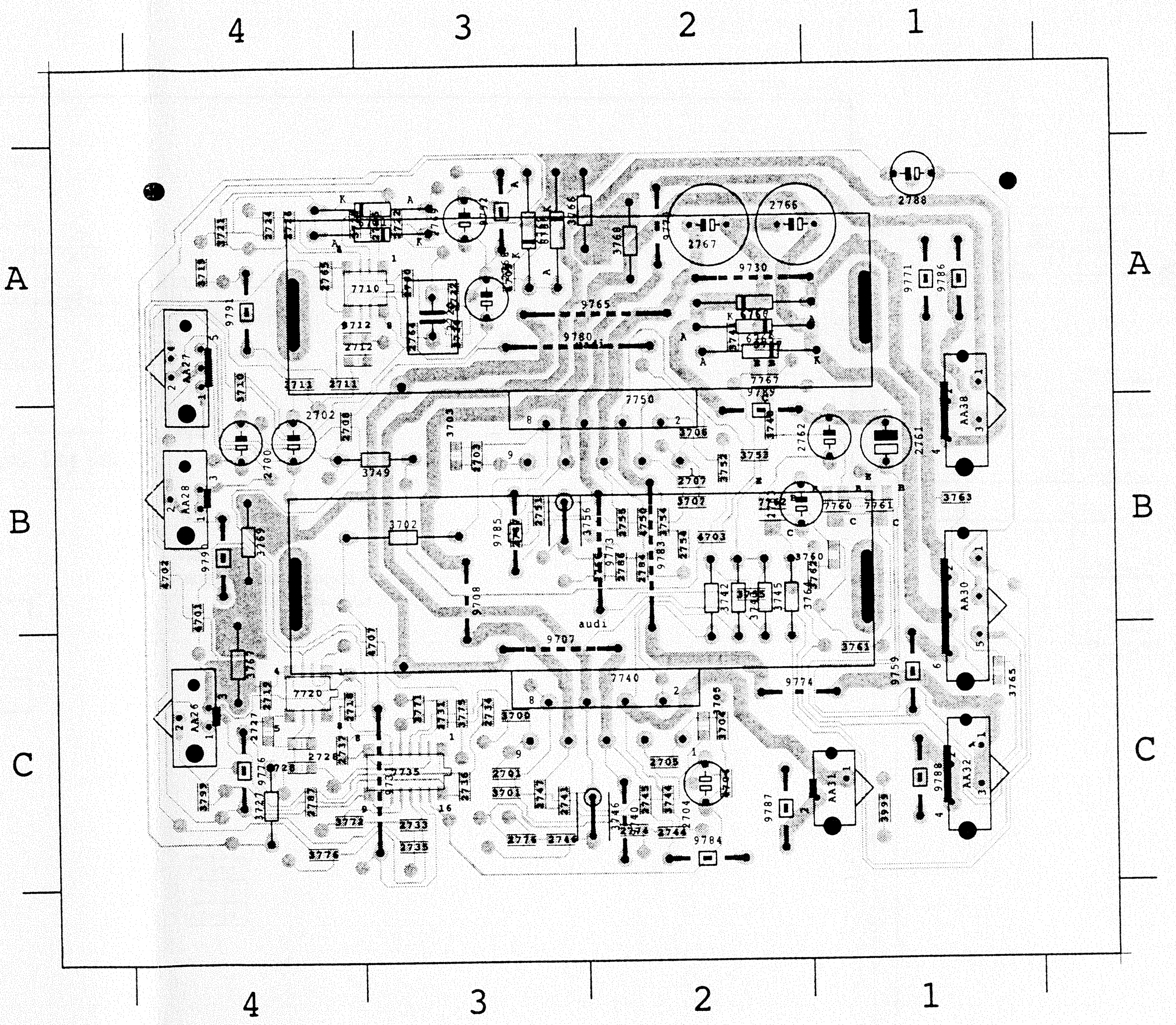
P17 ⦶ (+16V)
+16V DC
P17 ⏻ (+16V)
0V
P18 ⦶ (-16V)
-16V DC
P18 ⏻ (-16V)
0V

P19 ⦶ (+5 STANDBY)
4V8
P19 ⏻ (+5 STANDBY)
4V8
P20 ⦶ (AMP_MUTE 2)
MUTE 2V5
P20 ⏻ (AMP_MUTE 2)
NO MUTE 16V5

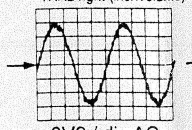
P21(DC PROT)
0V
P22 ⦶ (+300V)
300V
P22 ⏻ (+300V)
300V

OSC_AB.AI
130397

2700 B 4	2719 C 4	2734 C 3	2755 B 2	2769 A 3	3704 C 2	3725 A 4	3749 B 3	3765 C 1	4701 B 4	6767 A 1	7767 A 2	9774 C 1	9791 A 4
2701 C 3	2720 A 3	2735 C 3	2756 B 2	2774 C 2	3705 C 2	3727 C 4	3752 B 2	3766 A 2	4702 B 4	6768 A 3	9707 C 2	9776 C 4	9792 A 3
2702 B 4	2722 A 3	2736 C 3	2757 B 3	2776 C 3	3706 B 2	3728 C 4	3753 B 2	3767 B 4	4703 B 2	6769 A 3	9708 C 3	9780 A 2	AA26 C 4
2703 B 3	2724 A 4	2737 C 4	2761 B 1	2784 B 2	3707 B 2	3741 A 2	3754 B 2	3768 A 2	4704 C 2	7710 A 3	9730 A 1	9783 C 2	AA27 A 4
2704 C 2	2725 A 3	2741 C 3	2762 B 1	2786 B 2	3710 A 4	3742 B 2	3755 B 2	3769 B 4	4707 C 3	7720 C 4	9731 C 3	9784 C 2	AA28 B 4
2705 C 2	2726 A 4	2744 C 2	2763 B 2	2787 C 4	3711 A 4	3743 C 2	3756 B 3	3771 C 3	4709 A 3	7735 C 3	9740 C 2	9785 B 3	AA30 C 1
2707 B 2	2727 C 4	2745 C 2	2764 A 3	2788 A 1	3712 A 4	3744 C 2	3760 B 1	3772 C 4	4750 B 2	7740 C 2	9759 C 1	9786 A 1	AA31 C 1
2708 B 4	2728 C 4	2746 C 3	2765 A 4	3700 C 3	3719 A 4	3745 B 2	3761 C 1	3775 C 3	6720 A 4	7750 B 2	9765 A 2	9787 C 2	AA32 C 1
2711 A 4	2730 A 3	2747 C 3	2766 A 1	3701 C 3	3720 A 3	3746 C 2	3762 B 1	3776 C 4	6721 A 3	7760 B 1	9770 A 2	9788 C 1	AA38 B 1
2712 A 3	2731 C 3	2751 B 3	2767 A 2	3702 B 4	3721 A 4	3747 A 2	3763 B 1	3799 C 4	6765 A 2	7761 B 1	9771 A 1	9789 B 2	audi C 3
2718 C 4	2733 C 3	2754 B 2	2768 A 3	3703 B 3	3722 A 3	3748 B 2	3764 B 2	3999 C 1	6766 A 2	7762 B 2	9773 B 2	9790 B 4	uadi A 3

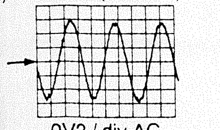


A1 (AUDIO AMP. OUT R)
-1KHz right (incr.volume)



0V2 / div AC
0.1ms / div

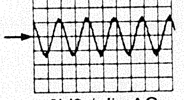
A2(AUDIO AMP. OUT L)
-3KHz left (incr.volume)



0V2 / div AC
0.2ms / div

A3 (SOUND_SUP)
29V5 DC

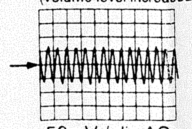
A4 (R_INPUT) -1KHz
(volume level increased)



0V2 / div AC
0.5ms / div

→ = 0V

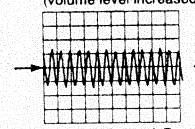
A5 (L_INPUT) -3KHz
(volume level increased)



50mV / div AC
0.5ms / div

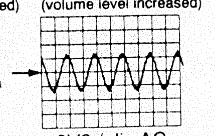
A6 (SOUND ENABLE)
MUTE = 0V
MUTE = 29V
A11 (SOUND 28V)
27V5 DC

A7 (AUDIO-L/S) -3KHz
(volume level increased)



50mV / div AC
0.5ms / div

A8 (AUDIO_R/S) -1KHz
(volume level increased)

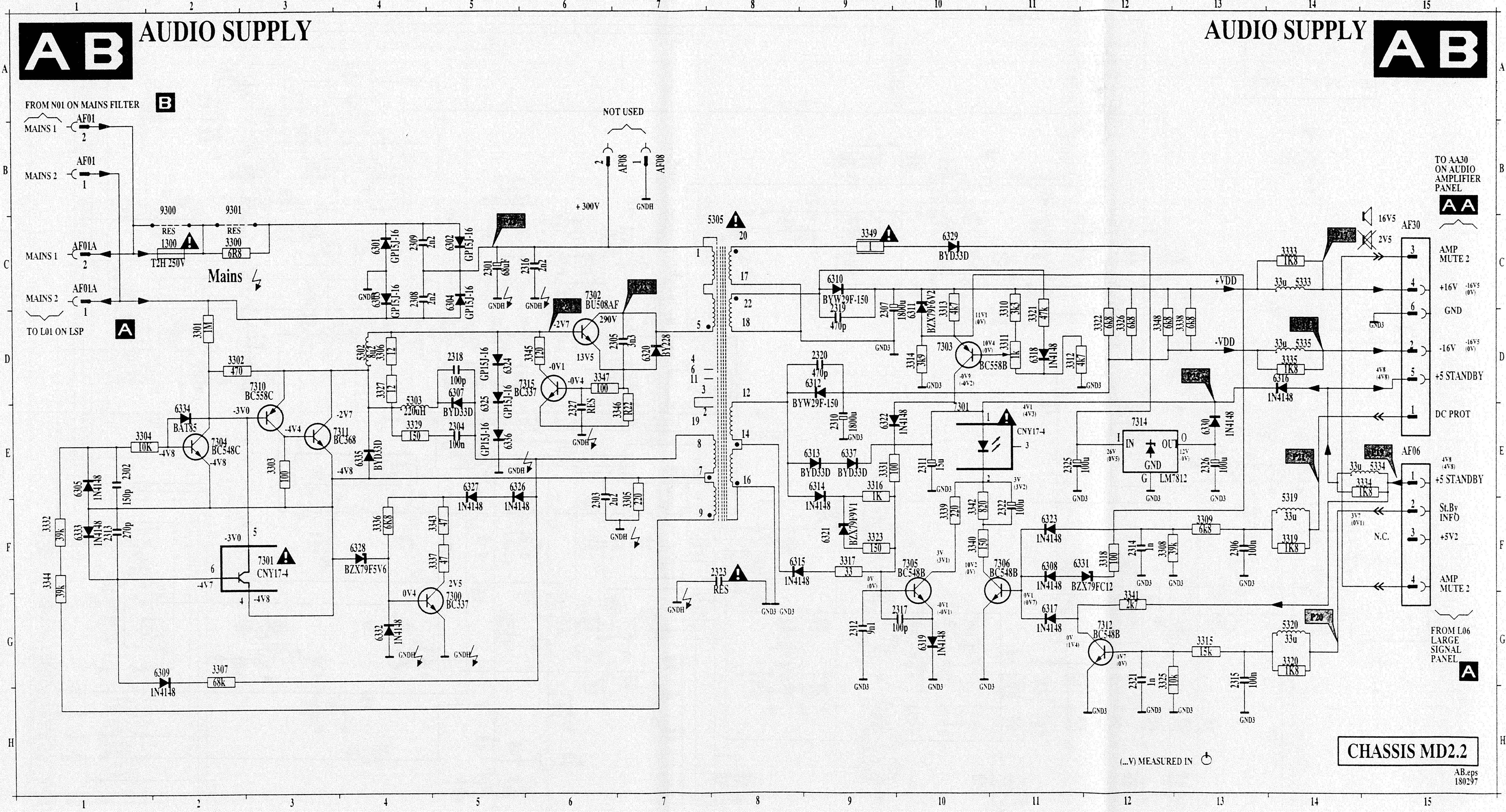


0V2 / div AC
0.5ms / div

OSC_AA.AI
250297

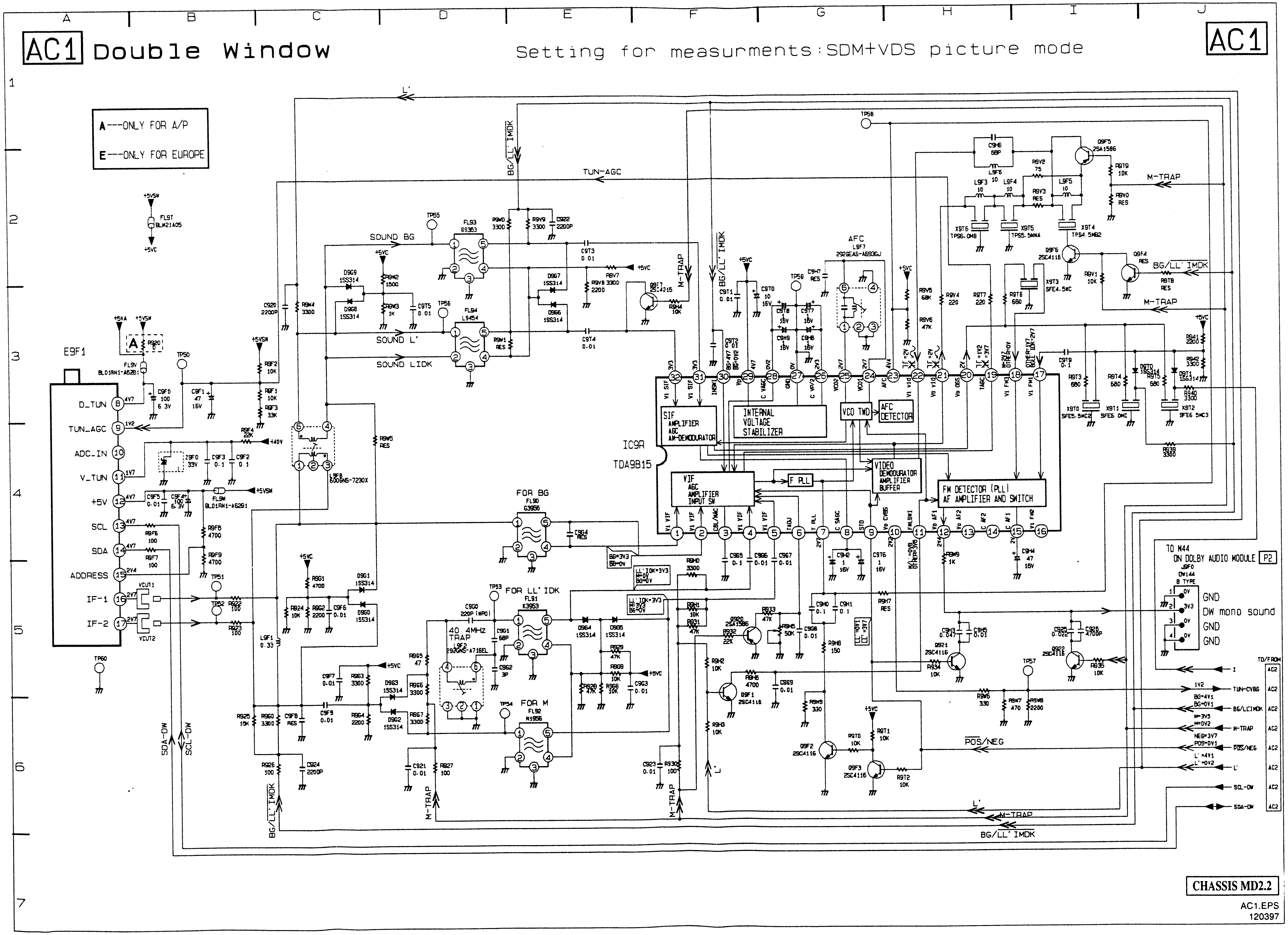
Audio supply panel / Ton-Speiseplatine / Platine alimentation audio

1300	C 2
2301	C 5
2302	E 1
2303	F 6
2304	E 5
2305	D 7
2306	F13
2307	C 9
2308	C 4
2309	C 4
2310	E 9
2311	E10
2312	G 9
2313	F 1
2314	F12
2315	G13
2316	C 6
2317	G10
2318	D 5
2319	D 9
2320	D 9
2321	G12
2322	F11
2323	F 8
2325	E11
2326	E13
2327	E 6
3300	C 2
3301	D 2
3302	D 2
3303	E 3
3304	E 1
3305	F 7
3306	D 4
3307	G 2
3308	F12
3309	F13
3310	C11
3311	D11
3312	D11
3313	C10
3314	D10
3315	G13
3316	E 9
3317	F 9
3318	F12
3319	F14
3320	G14
3321	D11
3322	D12
3323	F 9
3325	G12
3326	D12
3327	D 4
3329	E 4
3331	E 9
3332	F 1
3333	C14
3334	E15
3335	D14
3336	F 4
3337	F 5
3338	D13
3339	F10
3340	F10
3341	G12
3342	F10
3343	F 5
3344	F 1
3345	D 6
3346	E 7
3347	D 6
3348	D12
3349	C 9
3398	H 8
5302	D 4
5303	E 4
5305	C 8
5319	F14
5320	G14
5333	C14
5334	E15
5335	D14
6301	C 4
6302	C 5
6303	C 4
6304	C 5
6305	E 1
6307	D 5
6308	F11
6309	G 2
6310	C 9
6311	D10
6312	D 9
6313	E 9
6314	E 9
6315	F 8
6316	D14
6317	G11
6318	D11
6319	G10
6320	D 7
6321	F 9
6322	E 9
6323	F11
6324	D 5
6325	D 5
6326	E 5
6327	E 5
6328	F 4
6329	C10
6330	E13
6331	F12
6332	G 4
6333	F 1
6334	E 2
6335	E 4
6336	E 5
6337	E 9
7300	G 5
7301	F 3
7301	E10
7302	C 6
7303	D11
7304	E 2
7305	F10
7306	F11
7310	D 3
7311	E 3
7312	G12
7314	E12
7315	D 6
9300	B 2
9301	B 2
AF01	B 1
AF01	A 1
AF01A	C 1
AF01A	C 1
AF06	E15
AF08	B 7
AF08	B 7
AF30	C15
k1	B 8
k3	B 7


1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
A
B
C
D
E
F
G
H
AB
AUDIO SUPPLY
AUDIO SUPPLY
AB
FROM N01 ON MAINS FILTER
B
MAINS 1
AF01
MAINS 2
AF01
MAINS 1
AF01A
MAINS 2
AF01A
TO L01 ON LSP
A
9300
9301
RES
1300
T2H 250V
RES
3300
6R8
Mains
NOT USED
AF08
AF08
+300V
GNDH
5305
3349
6329
BYD33D
6310
BYW29F-150
2319
470p
2320
470p
6312
BYW29F-150
6301
GP15J-16
2309
2n2
6302
GP15J-16
2301
68uF
2316
2n2
6303
GP15J-16
2308
2n2
6304
GP15J-16
7302
BU508AF
290V
-2V7
2305
3n3
6320
BY228
3301
1M
3302
470
7310
BC558C
-3V0
-4V4
7311
BC368
-2V7
6334
BAT85
3304
10K
-4V8
7304
BC548C
-4V8
3303
100
5302
3306
12
3327
12
5303
220uH
3329
150
2304
100n
2318
100p
6307
BYD33D
6324
GP15J-16
6325
GP15J-16
6336
GP15J-16
6335
BYD33D
3345
120
7315
BC337
-0V1
-0V4
3347
100
2327
RES
3346
R22
13V5
6327
1N4148
6326
1N4148
3336
6K8
3343
47
3337
47
6328
BZX79F5V6
7300
BC337
0V4
2V5
6332
1N4148
7301
CNY17-4
-3V0
-4V7
-4V8
6305
1N4148
2302
150p
6333
1N4148
2313
270p
3332
39K
3344
39K
6309
1N4148
3307
68k
2303
2n2
3305
220
2323
RES
6313
BYD33D
6337
BYD33D
6314
1N4148
3316
1K
6321
BZX79F9V1
3323
150
6315
1N4148
3317
33
7305
BC548B
2312
9n1
2317
100p
6319
1N4148
2307
1800u
6311
BZX79F6V2
3313
4K7
3314
3K9
7303
BC558B
3310
3K3
3321
47K
3311
1K
6318
1N4148
3312
4K7
2310
1800u
6322
1N4148
3331
100
2311
15u
3339
220
3342
820
2322
100u
3340
150
7306
BC548B
CNY17-4
7314
LM7812
IN
OUT
GND
2325
100u
2326
100u
6330
1N4148
3322
6K8
3326
6K8
3348
6K8
3338
6K8
+VDD
-VDD
3333
1K8
5333
33u
5335
33u
3335
1K8
6316
1N4148
5334
33u
3334
1K8
6323
1N4148
3309
6K8
6308
1N4148
6331
BZX79FC12
3318
100
2314
1n
3308
39K
2306
100n
6317
1N4148
3341
2K7
7312
BC548B
3315
15K
2321
1n
3325
10K
2315
100n
5319
33u
3319
1K8
5320
33u
3320
1K8
P20
TO AA30 ON AUDIO AMPLIFIER PANEL
AA
AF30
16V5
2V5
AMP MUTE 2
+16V
GND
-16V
+5 STANDBY
DC PROT
AF06
+5 STANDBY
St.By INFO
N.C.
+5V2
AMP MUTE 2
FROM L06 LARGE SIGNAL PANEL
A
GND3
GNDH
CHASSIS MD2.2
(...V) MEASURED IN
AB.eps
180297

AC1 Double Window

Setting for measurments: SDM+VDS picture mode

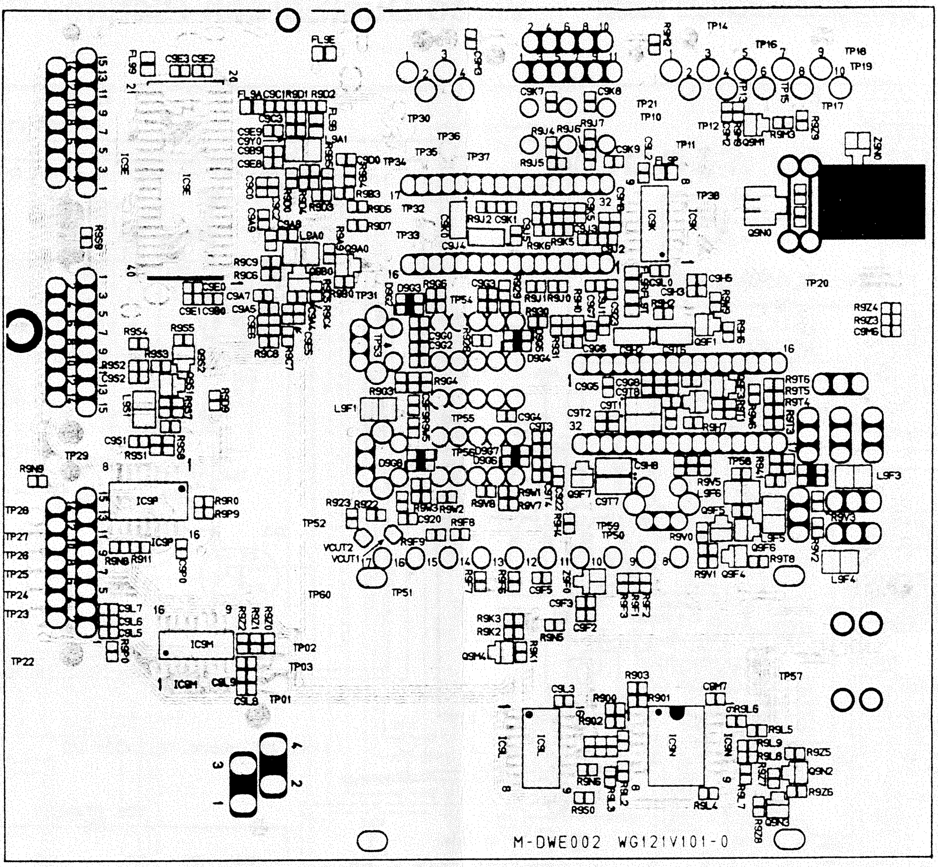

A
B
C
D
E
F
G
H
I
J
1
2
3
4
5
6
7
AC1
A---ONLY FOR A/P
E---ONLY FOR EUROPE
E9F1
D_TUN
TUN_AGC
ADC_IN
V_TUN
+5V
SCL
SDA
ADDRESS
IF-1
IF-2
TP60
TP50
TP51
TP52
TP53
TP54
TP55
TP56
TP57
TP58
TP59
+5VSW
FL9T BLM21A05
+5VC
+5VA
FL9V BLD1RN1-A62B1
FL9W BLD1RN1-A62B1
Z9F0 33V
+40V
SOUND BG
SOUND L'
SOUND LIDK
FL93 G9363
FL94 L9454
L9F8 600BNS-7230X
D9G9 1SS314
D9G8 1SS314
D967 1SS314
D966 1SS314
TUN-AGC
L'
BG/LL' IMDK
M-TRAP
Q9E7 2SC4215
FOR BG FL90 G3956
FOR LL' IDK FL91 K3953
FOR M FL92 M1956
40 4MHz TRAP L9F2 292GNS-A716EL
C9G0 220P (NPO)
IC9A
TDA9815
SIF AMPLIFIER AGC AM-DEMODURATOR
INTERNAL VOLTAGE STABILIZER
VCO TWD
AFC DETECTOR
AFC L9F7 292BEAS-A693GJ
VIF AGC AMPLIFIER INPUT SW
F PLL
VIDEO DEMODURATOR AMPLIFIER BUFFER
FM DETECTOR (PLL) AF AMPLIFIER AND SWITCH
Q9F5 2SA1586
Q9F6 2SC4116
Q9F4 RES
X9T6 TPS6.0MB
X9T5 TPS5.5MWA
X9T4 TPS4.5MB2
X9T3 SFE4.5MC
X9T0 SFE5.5MC2
X9T1 SFE6.0MC
X9T2 SFE6.5MC3
BG/LL' IMDK
M-TRAP
Q920 2SA1586
Q9F1 2SC4116
Q921 2SC4116
Q922 2SC4116
Q9F2 2SC4116
Q9F3 2SC4116
POS/NEG
TO M44 ON DOLBY AUDIO MODULE P2
J9F0 DW144 B TYPE
GND
DW mono sound
GND
GND
TO/FROM
I
TUN-CVBS
BG/LL'IMDK
M-TRAP
POS/NEG
L'
SCL-DW
SDA-DW
AC2
BG=4V1 BG=0V1
M=3V5 M=0V2
NEG=3V7 POS=0V1
L'=4V1 L'=0V2
BG=3V3 BB=0V
LL'IDK=3V3 M=0V BG=0V
SDA-DW
SCL-DW
VCUT1
VCUT2
L9F1 0.33

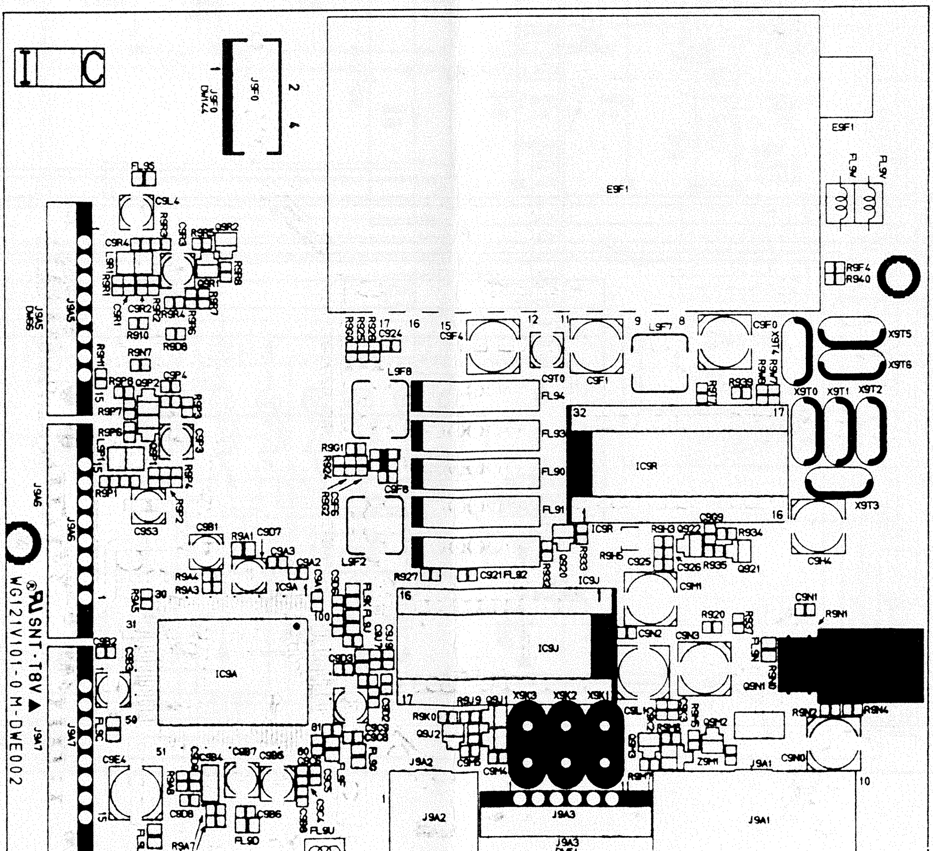
CHASSIS MD2.2

AC1.EPS
120397

40A

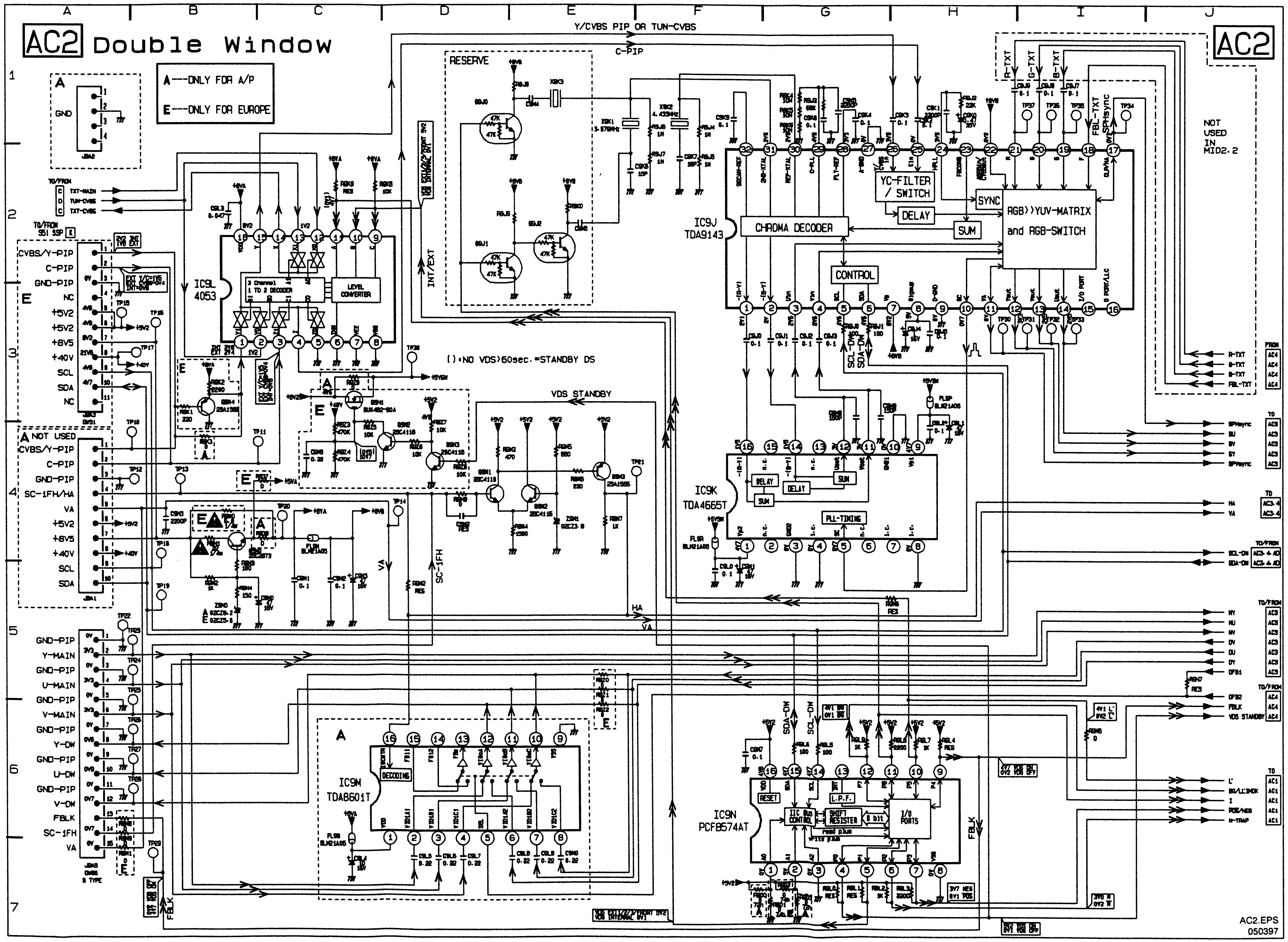
Video DualScreen panel / Video-DualScreen-Platine /

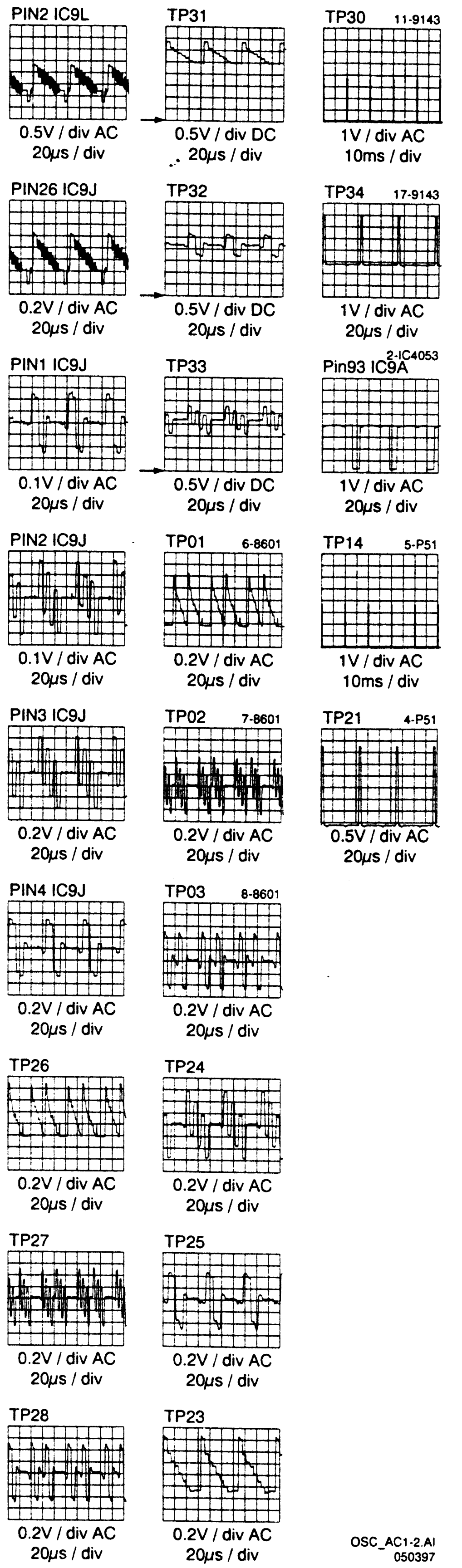

M-DWE002 WG121V101-0


WG121V101-0 M-DWE002

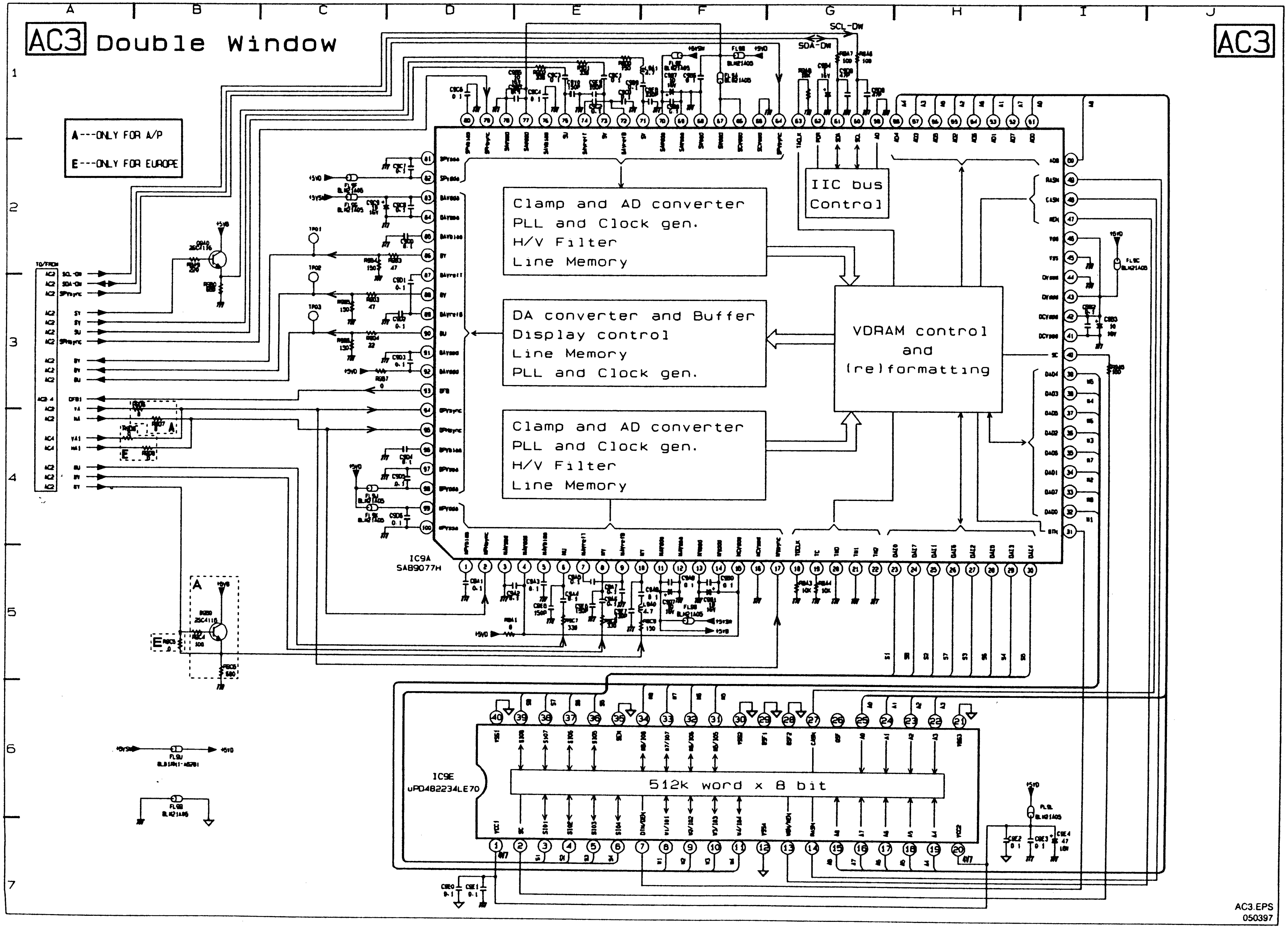
Video-DualScreen-Platine / Platine Video DualScreen

Video DualScreen panel /


AC2 Double Window
A---ONLY FOR A/P
E---ONLY FOR EUROPE
Y/CVBS PIP OR TUN-CVBS
C-PIP
RESERVE
IC9L
4053
3 Channel 1 TO 2 DECODER
LEVEL CONVERTER
INT/EXT
IC9J
TDA9143
CHROMA DECODER
YC-FILTER / SWITCH
DELAY
SUM
SYNC
RGB>>YUV-MATRIX and RGB-SWITCH
CONTROL
R-TXT
G-TXT
B-TXT
FBL-TXT
SPHsync
NOT USED IN MID2.2
( ) = NO VDS>60sec.=STANDBY DS
VDS STANDBY
IC9K
TDA4665T
PLL-TIMING
IC9M
TDA8601T
DECODING
IC9N
PCF8574AT
RESET
IIC Bus CONTROL
SHIFT REGISTER
8 bit
I/O PORTS
L.P.F.
SDA-DW
SCL-DW
FBLK
HA
VA
SC-1FH
TXT-MAIN
TUN-CVBS
TXT-CVBS
CVBS/Y-PIP
C-PIP
GND-PIP
NC
+5V2
+8V5
+40V
SCL
SDA
NOT USED
SC-1FH/HA
Y-MAIN
U-MAIN
V-MAIN
Y-DW
U-DW
V-DW
AC2.EPS
050397



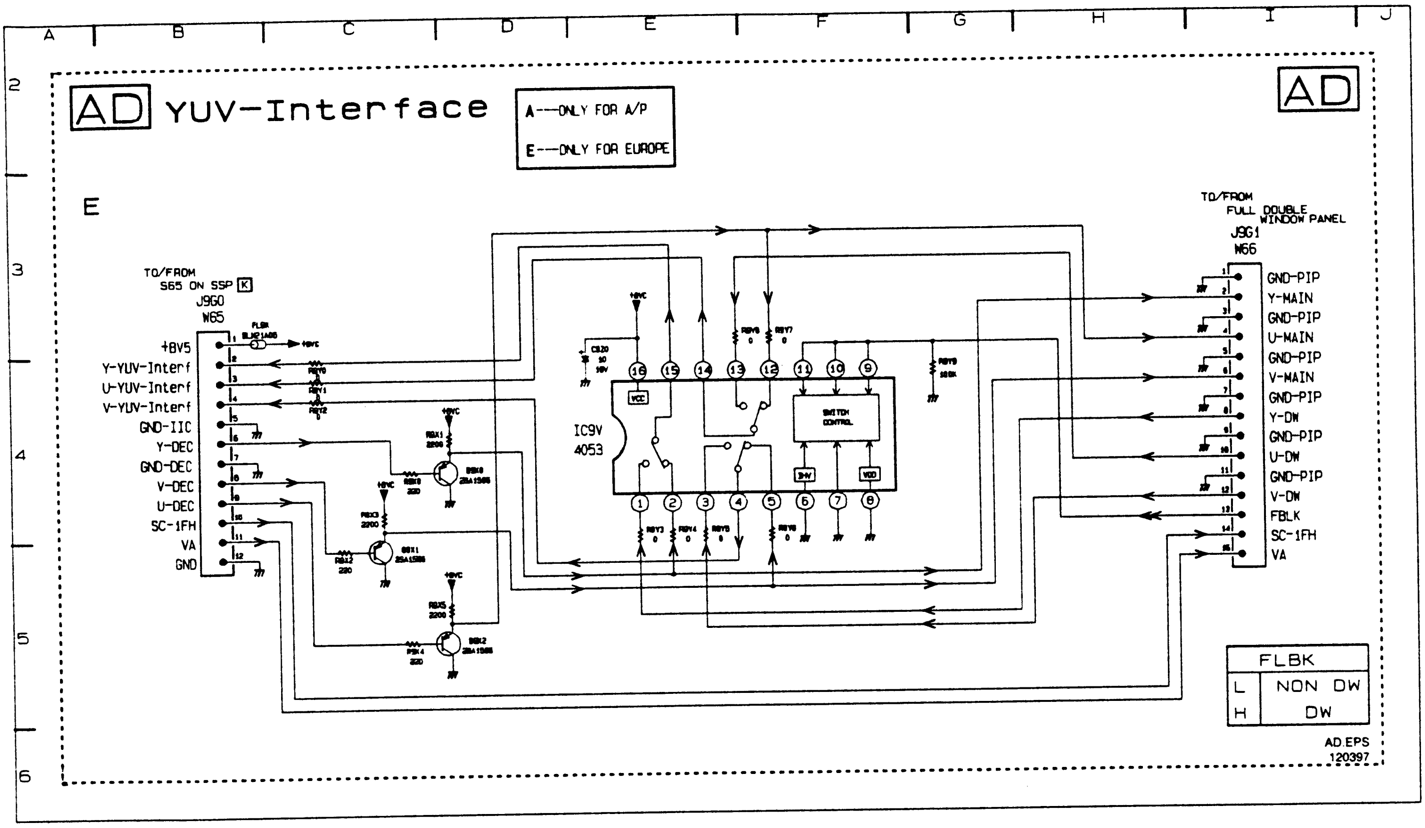
Video DualScreen panel / Video-DualScreen-Platine / Platine Video DualScreen

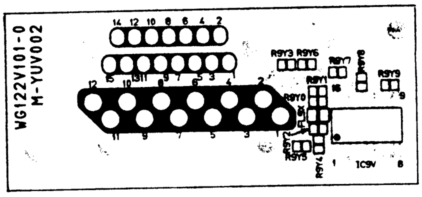

AC3
Double Window
AC3
A---ONLY FOR A/P
E---ONLY FOR EUROPE
SCL-DW
SDA-DW
IIC bus Control
Clamp and AD converter
PLL and Clock gen.
H/V Filter
Line Memory
DA converter and Buffer
Display control
Line Memory
PLL and Clock gen.
VDRAM control
and
(re)formatting
Clamp and AD converter
PLL and Clock gen.
H/V Filter
Line Memory
IC9A
SAB9077H
TP01
TP02
TP03
IC9E
uPD482234LE70
512k word x 8 bit
+5VD
+5VSW
A
E
A B C D E F G H I J
1 2 3 4 5 6 7

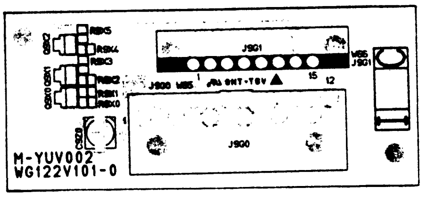
AC3.EPS
050397

42A

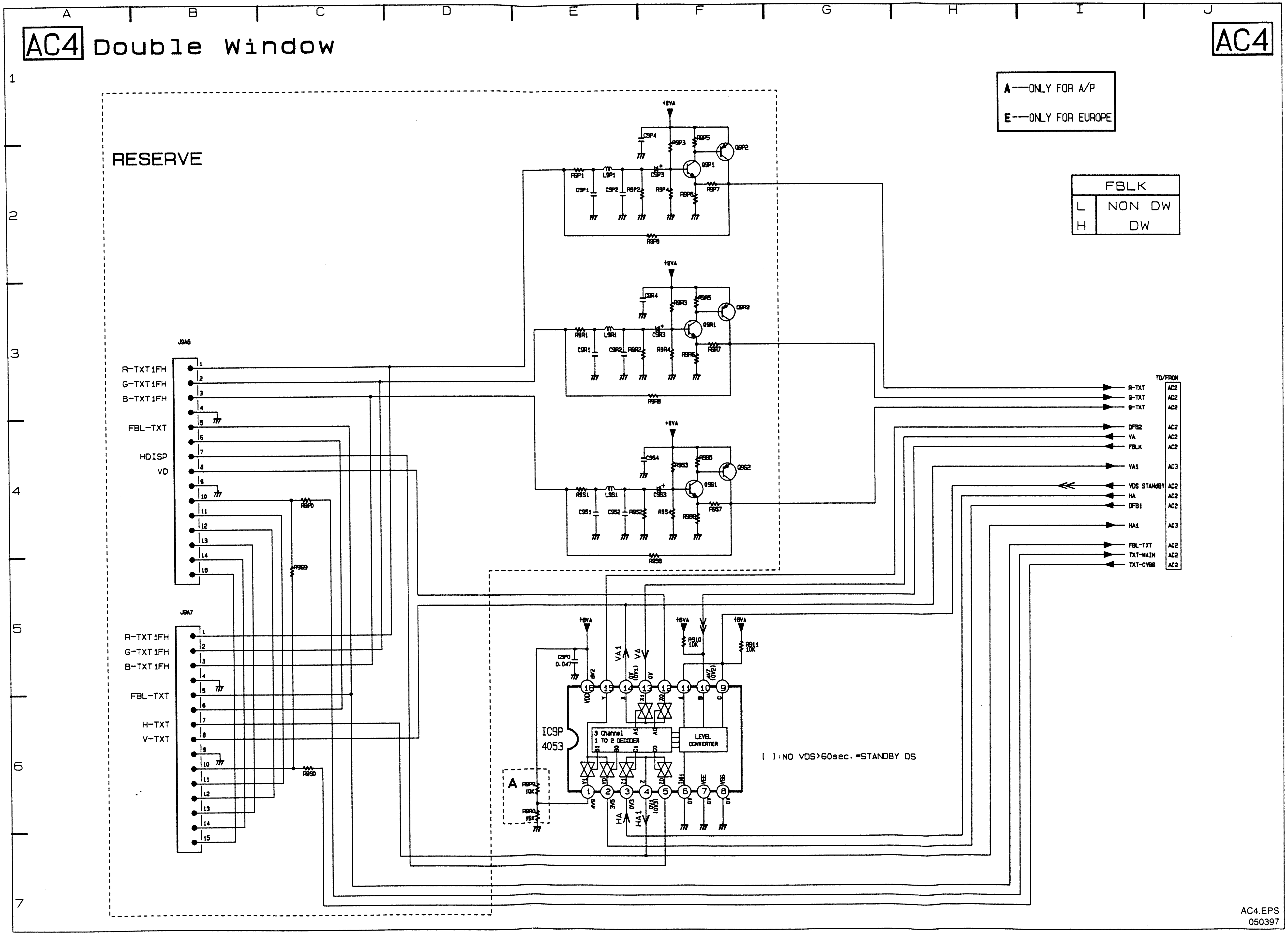
YUV-interface panel / YUV-Schnittstellenplatine / Platine YUV-interface


A
B
C
D
E
F
G
H
I
J
2
3
4
5
6
AD
YUV-Interface
A---ONLY FOR A/P
E---ONLY FOR EUROPE
AD
E
TO/FROM
S65 ON SSP K
J9G0
W65
+8V5
Y-YUV-Interf
U-YUV-Interf
V-YUV-Interf
GND-IIC
Y-DEC
GND-DEC
V-DEC
U-DEC
SC-1FH
VA
GND
FLBK
+8VC
RBY0
RBY1
RBY2
RBX1
2200
RBX0
220
BBX0
2SA1586
RBX3
2200
RBX2
220
BBX1
2SA1586
RBX5
2200
RBX4
220
BBX2
2SA1586
C920
10
16V
IC9V
4053
VCC
SWITCH
CONTROL
VDD
RBY6
0
RBY7
0
RBY3
0
RBY4
0
RBY5
0
RBY8
0
RBY9
100K
TO/FROM
FULL DOUBLE
WINDOW PANEL
J9G1
W66
GND-PIP
Y-MAIN
GND-PIP
U-MAIN
GND-PIP
V-MAIN
GND-PIP
Y-DW
GND-PIP
U-DW
GND-PIP
V-DW
FBLK
SC-1FH
VA
FLBK
L NON DW
H DW
AD.EPS
120397


WG122V101-0
M-YUV002
14 12 10 8 6 4 2
15 13 11 9 7 5 3 1
RSY3 RSY6
RSY7
RSY8
RSY9
RSY1
RSY0
RSY4
RSY5
1
IC9V
8

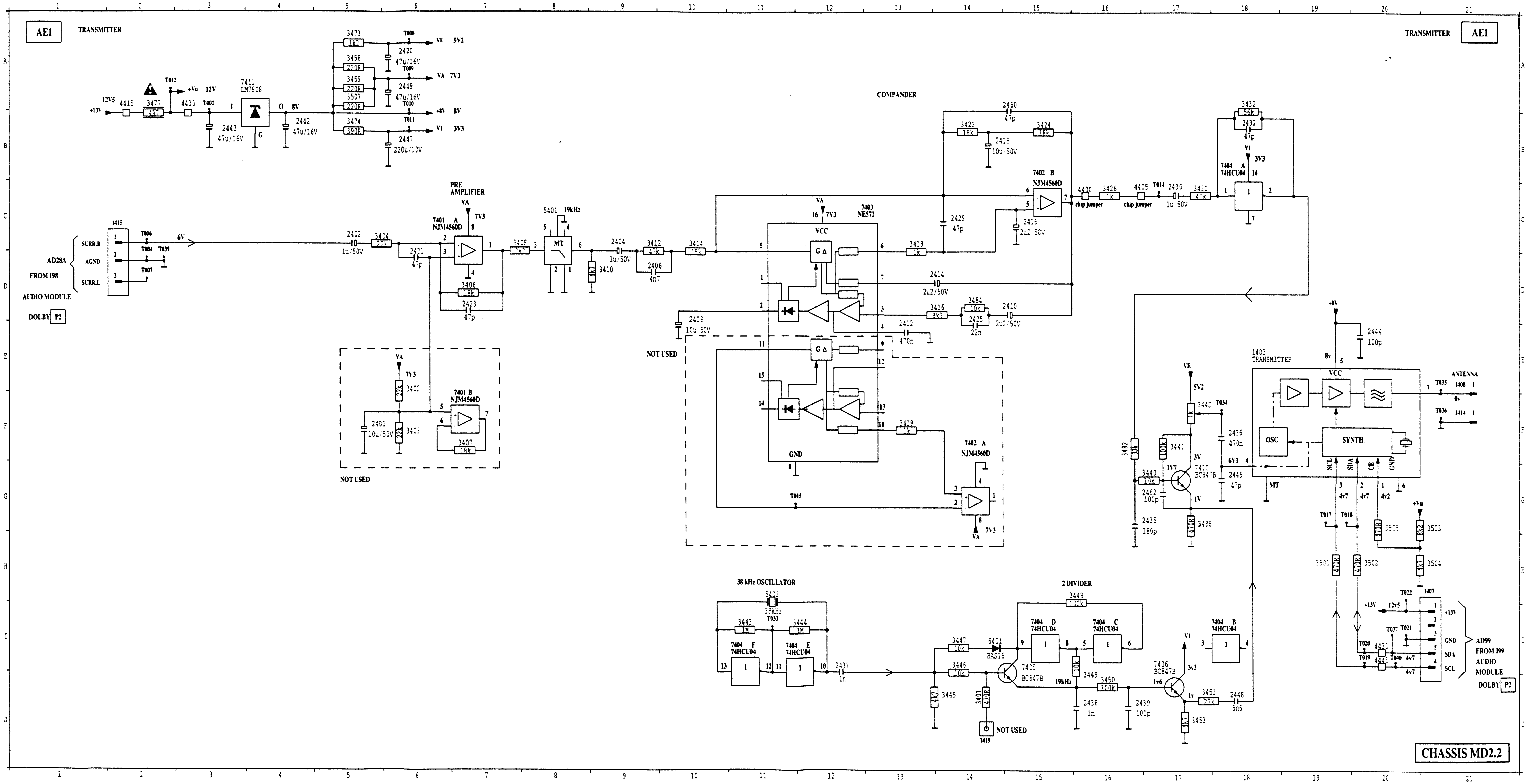

BBX2
RBX5
RBX4
RBX3
BBX1
BBX0
RBX2
RBX1
RBX0
J9G1
W66
J9G1
J9G0 W65
15
12
C920
J9G0
M-YUV002
WG122V101-0

Video DualScreen panel / Video-DualScreen-Platine / Platine Video DualScreen


A
B
C
D
E
F
G
H
I
J
1
2
3
4
5
6
7
AC4 Double Window
AC4
A---ONLY FOR A/P
E---ONLY FOR EUROPE
FBLK
L NON DW
H DW
RESERVE
+8VA
C9P4
R9P3
R9P5
Q9P2
Q9P1
R9P1
L9P1
C9P3
C9P1
C9P2
R9P2
R9P4
R9P6
R9P7
R9P8
C9R4
R9R3
R9R5
Q9R2
Q9R1
R9R1
L9R1
C9R3
C9R1
C9R2
R9R2
R9R4
R9R6
R9R7
R9R8
C9S4
R9S3
R9S5
Q9S2
Q9S1
R9S1
L9S1
C9S3
C9S1
C9S2
R9S2
R9S4
R9S6
R9S7
R9S8
J9A6
R-TXT1FH
G-TXT1FH
B-TXT1FH
FBL-TXT
HDISP
VD
R9P0
R999
J9A7
R-TXT1FH
G-TXT1FH
B-TXT1FH
FBL-TXT
H-TXT
V-TXT
R9S0
TO/FROM
R-TXT AC2
G-TXT AC2
B-TXT AC2
DFB2 AC2
VA AC2
FBLK AC2
VA1 AC3
VDS STANdBY AC2
HA AC2
DFB1 AC2
HA1 AC3
FBL-TXT AC2
TXT-MAIN AC2
TXT-CVBS AC2
C9P0 0.047
VA1
VA
R910 10K
R911 10K
8V2
0V (0V1)
0V
4V7 (0V2)
VDD Y X X1 X0 A B C
IC9P 4053
3 Channel 1 TO 2 DECODER
A1 A0 B1 B0 C1 C0
LEVEL CONVERTER
Y1 Y0 Z1 Z Z0 INH VEE VSS
4V9 3V5 0V3 0V1 (0V3) 0V 0V 0V
HA
HA1
A
R9P9 10K
R9R0 15K
[ ] : NO VDS>60sec.=STANDBY DS
AC4.EPS
050397

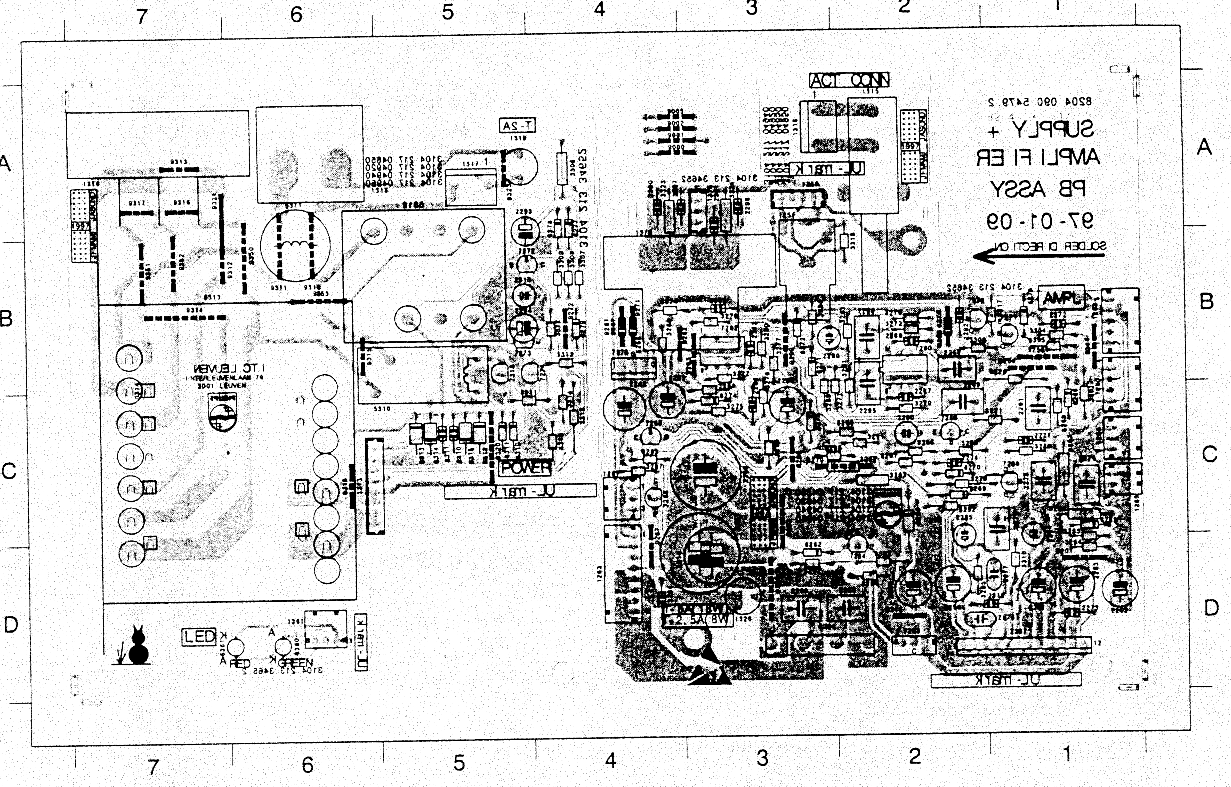
Wireless Dolby / Drahtlos-Dolby / Dolby sans fil

1403	E18
1407	H21
1408	E21
1414	F21
1415	C 2
1419	J14
2401	E 5
2402	C 5
2404	C 9
2406	D 9
2408	D11
2410	D15
2412	E13
2414	D14
2416	C15
2418	B15
2420	A 6
2421	D 6
2423	D 7
2425	D14
2429	C14
2430	C17
2432	B18
2435	G17
2436	F18
2437	I12
2438	J16
2439	J17
2442	B 4
2443	B 3
2444	E20
2445	G18
2447	B 6
2448	J18
2449	A 6
2460	A15
2462	G17
3401	J14
3402	E 6
3403	E 6
3404	C 6
3406	D 7
3407	E 7
3408	C 8
3410	D 9
3412	C 9
3414	C10
3416	D14
3418	C13
3419	F13
3422	B14
3424	B15
3426	C16
3430	C17
3432	A18
3440	G17
3441	F17
3442	F17
3443	I11
3444	I12
3445	J14
3446	I14
3447	I14
3448	H16
3449	J16
3450	J16
3451	J17
3453	J17
3458	A 5
3459	A 5
3473	A 5
3474	B 5
3477	A 2
3482	F16
3484	D14
3486	G17
3501	H19
3502	H20
3503	G21
3504	H21
3505	G20
3507	A 5
4400	C16
4405	C17
4415	A 2
4430	I20
4433	A 3
4445	I20
5401	C 8
5403	H11
6401	I14
7401	C 6
7401	E 7
7402	F14
7402	B15
7403	C13
7404	B18
7404	I17
7404	I16
7404	I15
7404	I11
7404	I11
7405	I15
7406	I17
7410	G17
7411	A 3

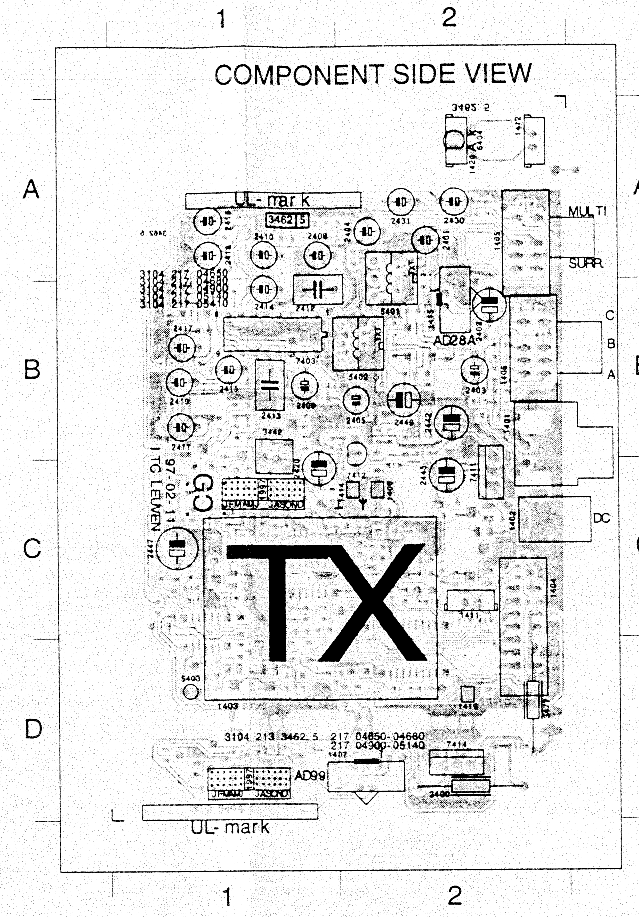

AE1
TRANSMITTER
12V5
+13V
4415
3477
4R7
T012
+Vu
12V
4433
T002
7411
LM7808
2443
47u/16V
2442
47u/16V
8V
3473
1k2
T008
VE 5V2
2420
47u/16V
3458
220R
3459
220R
3507
220R
T009
VA 7V3
2449
47u/16V
T010
+8V 8V
3474
390R
T011
V1 3V3
2447
220u/10V
COMPANDER
PRE AMPLIFIER
7401 A
NJM4560D
7401 B
NJM4560D
1415
SURR.R
AGND
SURR.L
T006
T004
T039
T007
6V
AD28A
FROM 198
AUDIO MODULE
DOLBY P2
2402
1u/50V
3404
22k
2421
47p
3406
18k
2423
47p
3428
3k3
5401
19kHz
MT
3410
4k7
2404
1u/50V
3412
47k
2406
4n7
3414
15k
3402
22k
3403
22k
2401
10u/50V
3407
18k
NOT USED
7403
NE572
VCC
GND
G Δ
2408
10u 50V
NOT USED
2460
47p
3422
18k
3424
18k
2418
10u/50V
2429
47p
7402 B
NJM4560D
2416
2u2 50V
3418
1k
2414
2u2/50V
3416
3k3
3484
10k
2425
22n
2410
2u2/50V
2412
470n
7402 A
NJM4560D
3419
1k
T015
4400
chip jumper
3426
1k
4405
chip jumper
T014
2430
1u 50V
3430
47k
3432
56k
2432
47p
7404 A
74HCU04
3V3
1403
TRANSMITTER
VCC
OSC
SYNTH.
SCL
SDA
CE
GND
MT
ANTENNA
T035
1408
T036
1414
2444
100p
3482
33k
2435
180p
3440
10k
2462
100p
3442
1k
T034
3441
100k
7410
BC847B
2436
470n
2445
47p
6V1
1V7
3V
1V
3486
470R
T017
T018
3505
470R
3503
8k2
3504
4k7
3501
470R
3502
470R
T022
1407
+13V
12V5
T037
T021
T020
T019
4430
4445
T040
GND
SDA
SCL
4v7
4v2
AD99
FROM 199
AUDIO MODULE
DOLBY P2
38 kHz OSCILLATOR
5403
38kHz
T033
3443
1M
3444
1M
7404 F
74HCU04
7404 E
74HCU04
2437
1n
2 DIVIDER
3448
100k
7404 D
74HCU04
7404 C
74HCU04
7404 B
74HCU04
3447
10k
6401
BAS16
3446
10k
7405
BC847B
3445
4k7
3401
470R
1419
NOT USED
3449
10k
19kHz
3450
100k
2438
1n
2439
100p
7406
BC847B
1v6
3451
27k
2448
5n6
3453
4k7
CHASSIS MD2.2

Wireless Dolby / Drahtlos-Dolby / Dolby sans fil

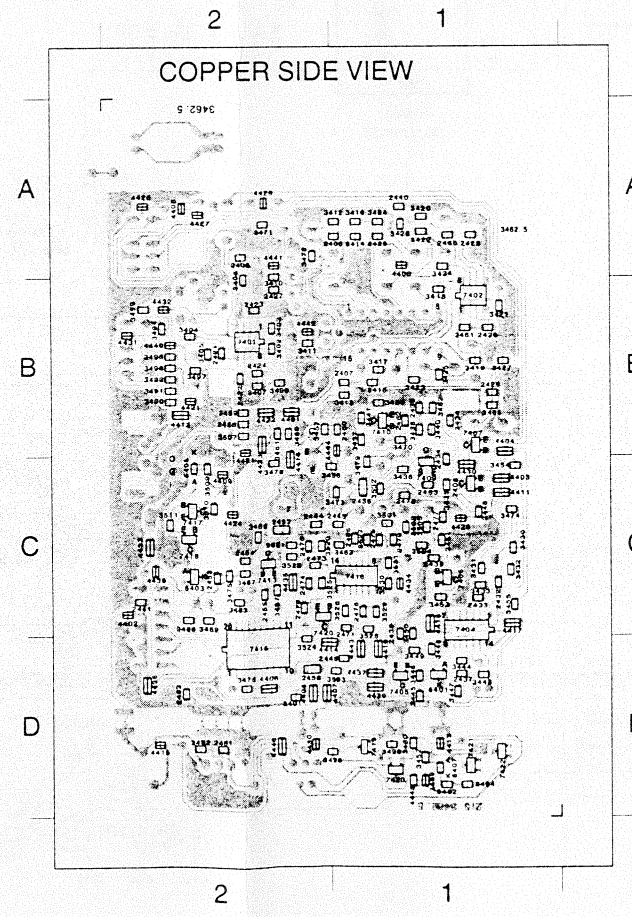
2297 A 3	9360 B 6	9311 B 6	6311 C 5	3312 B 4	1319 A 5	0217 D 6	0204 C 7	1361 D 6	9212 D 2	7268 C 1	6273 C 3	6260 C 2	3298 C 2	3287 C 4	3276 C 3	3264 D 1	2295 C 2	2282 D 1	2271 C 1	1320 D 3	9000 A 4
2298 A 3	9361 B 7	9312 A 7	6312 C 5	3313 B 4	2293 A 6	0306 C 6	0205 C 7	6360 D 6	9261 B 4	7269 C 2	6274 C 3	6262 D 3	3301 C 1	3288 C 1	3277 B 3	3265 D 1	2296 C 3	2283 D 1	2272 B 1	2260 B 3	9001 A 4
2300 A 4	9362 B 7	9313 A 7	6313 C 5	3314 C 4	2294 B 5	0307 C 6	0206 B 7	6361 D 6	9262 B 4	7270 B 2	6275 B 1	6264 D 3	3302 D 2	3289 C 1	3278 B 3	3266 D 2	2299 D 2	2284 D 1	2273 D 1	2261 C 4	9002 A 4
2301 A 3	9363 B 6	9314 B 7	6314 C 5	3315 C 4	2310 C 5	0309 C 7	0207 B 7	....	9263 B 3	7271 B 1	6276 B 2	6265 C 1	3303 B 2	3290 B 3	3279 C 2	3267 D 3	2302 B 3	2285 D 2	2274 C 2	2262 C 4	9003 A 4
3318 B 2	....	9315 B 6	6315 C 5	3316 C 4	2311 C 5	0311 C 7	0210 B 6	0101 A 6	9264 B 1	7276 B 4	7260 B 2	6266 C 1	3304 B 1	3291 C 2	3280 B 3	3269 C 3	2312 D 1	2286 D 2	2275 C 1	2263 C 3	....
3323 A 4	1260 A 3	9316 A 7	7272 B 5	5310 B 5	2315 B 5	0313 C 7	0211 C 6	0104 A 5	9266 C 3	9200 D 3	7262 B 3	6267 B 4	3305 B 1	3292 C 2	3281 C 2	3270 C 2	2313 B 3	2287 C 2	2276 C 1	2264 D 4	1280 C 1
3324 A 3	1261 B 3	9317 A 7	7273 B 5	5311 B 6	3306 A 4	0314 B 7	0212 C 6	0105 B 5	9267 D 4	9201 D 1	7263 D 2	6268 B 4	3317 B 1	3293 C 1	3282 C 2	3271 C 2	2314 D 3	2288 B 2	2277 D 1	2265 D 2	1281 C 4
	1315 A 2	9319 C 6	7274 B 4	6277 A 4	3307 B 4	1313 C 6	0213 C 6	0107 B 5	9268 B 2	9203 C 3	7264 D 2	6269 C 2	3319 D 1	3294 C 1	3283 C 4	3272 B 2	3260 B 4	2289 B 2	2278 D 2	2266 D 3	1282 B 1
	1316 A 3	9320 C 5	7310 B 5	6278 A 4	3308 B 4	1314 A 7	0214 C 6	0201 D 7	9270 C 2	9204 B 1	7265 C 4	6270 C 2	3320 B 1	3295 D 2	3284 C 3	3273 B 2	3261 B 2	2290 C 2	2279 C 1	2267 D 3	1283 D 4
	1375 A 3	9321 A 7	9272 B 4	6279 B 4	3309 B 4	1317 A 5	0215 C 6	0202 C 7	9271 B 4	9205 B 1	7266 C 4	6271 B 3	3321 C 1	3296 C 2	3285 C 3	3274 B 4	3262 C 2	2291 C 1	2280 C 3	2268 B 2	1284 C 1
	1376 B 3	9323 A 5	9310 B 6	6310 C 5	3311 C 5	1318 A 6	0216 D 6	0203 C 7	....	9209 B 3	7267 D 1	6272 B 3	3322 B 3	3297 C 2	3286 C 3	3275 C 3	3263 C 2	2292 B 2	2281 D 1	2269 C 2	1285 C 1



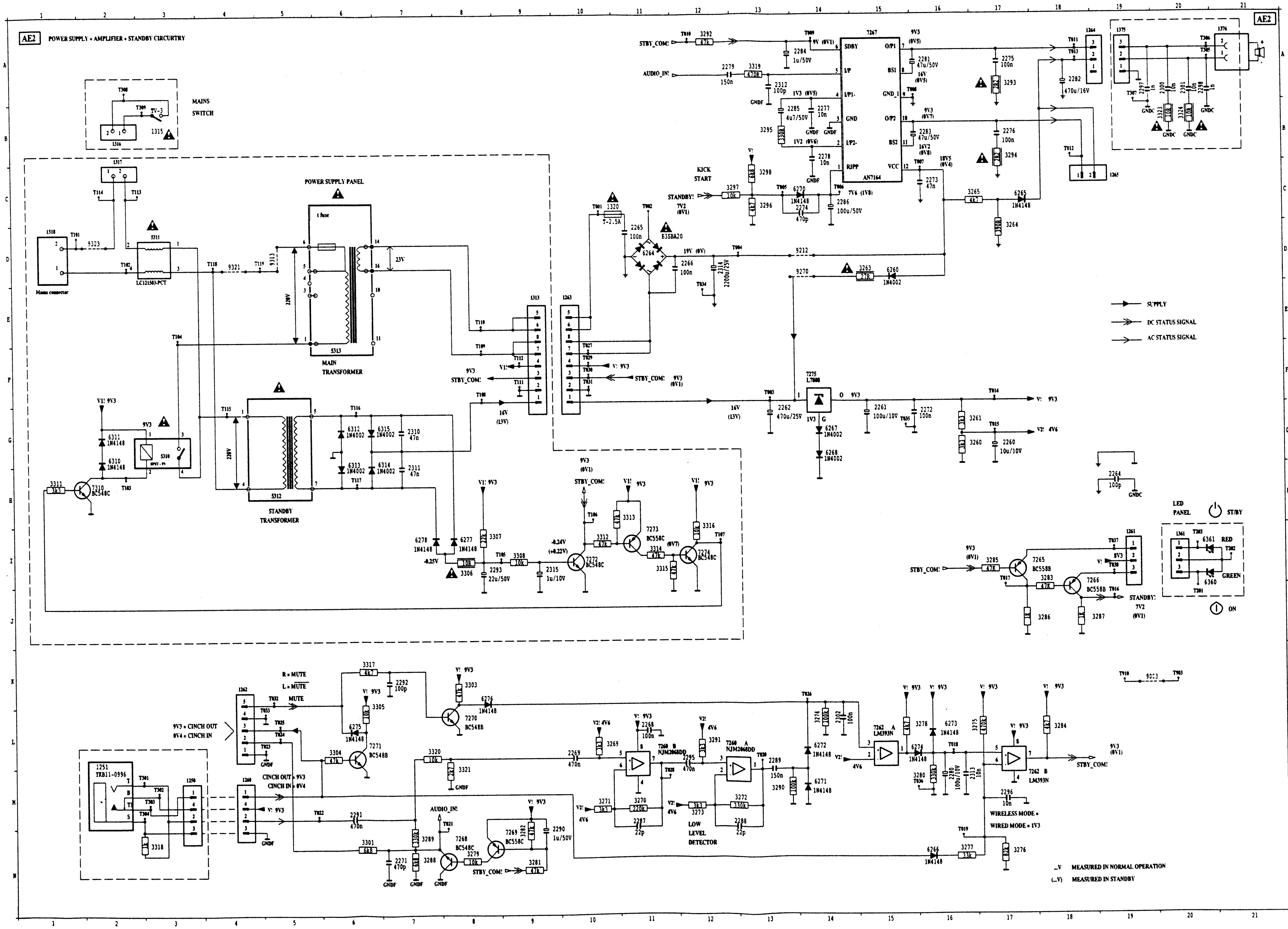
Wireless Dolby / Drahtlos-Dolby / Dolby sans fil



1412 A 2
1420 A 2
6404 A 2
....
1401 B 2
1402 C 2
1403 D 1
1404 D 2
1405 A 2
1406 B 2
1407 D 2
1408 C 2
1411 C 2
1414 C 2
1415 B 2
1419 D 2
2401 A 2
2402 B 2
2403 B 2
2404 A 2
2405 B 2
2408 A 1
2409 B 1
2410 A 1
2411 B 1
2412 B 1
2413 B 1
2414 B 1
2415 B 1
2416 A 1
2417 B 1
2418 A 1
2419 B 1
2420 C 1
2430 A 2
2431 A 2
2442 B 2
2443 C 2
2447 C 1
2449 B 2
3400 D 2
3442 B 1
3477 D 2
5401 A 2
5402 B 2
5403 D 1
7403 B 1
7411 C 2
7412 B 2
7414 D 2



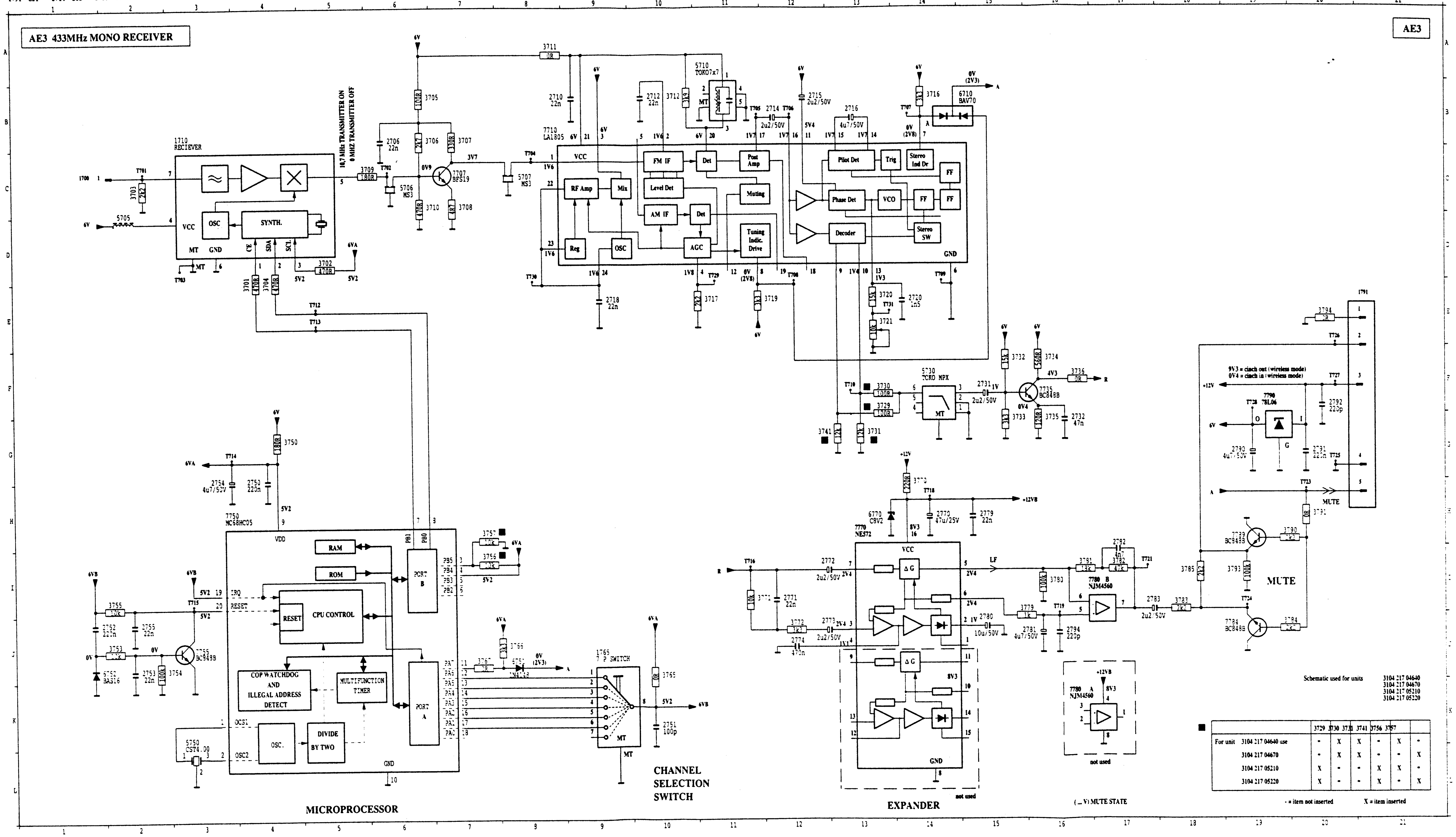
2406 A 1	3410 A 2	3471 A 2	4413 D 1
2407 B 1	3411 B 2	3472 A 2	4414 D 2
2421 B 2	3412 A 1	3473 C 1	4415 D 2
2422 B 2	3413 B 1	3474 C 1	4416 C 2
2423 B 2	3414 A 1	3475 C 2	4417 C 1
2424 B 2	3415 B 1	3476 C 2	4418 C 1
2425 A 1	3416 A 1	3478 D 2	4419 D 1
2426 B 1	3417 B 1	3479 C 1	4420 D 1
2427 B 2	3418 B 1	3480 D 1	4421 B 2
2428 B 1	3419 B 1	3482 B 1	4422 B 2
2429 A 1	3420 A 1	3483 C 2	4423 B 2
2432 C 1	3421 B 1	3484 A 1	4424 C 2
2433 C 1	3422 A 1	3485 B 1	4425 C 1
2434 C 1	3423 B 1	3486 B 1	4426 A 2
2435 B 1	3424 A 1	3487 C 2	4427 A 2
2436 C 1	3425 B 1	3488 C 2	4428 A 2
2437 D 1	3426 A 1	3490 B 2	4430 D 2
2438 C 1	3427 B 1	3491 B 2	4431 B 2
2439 C 1	3428 D 1	3492 B 2	4432 B 2
2440 A 1	3429 D 1	3494 B 2	4433 C 2
2441 C 2	3430 C 1	3495 B 2	4434 C 1
2444 C 2	3431 C 1	3496 B 2	4435 C 2
2445 C 1	3432 C 1	3497 B 2	4436 D 2
2446 D 1	3433 C 1	3499 B 2	4437 D 1
2448 C 1	3434 B 1	3501 C 1	4438 C 2
2452 C 2	3435 C 1	3502 C 1	4440 B 2
2453 C 2	3436 C 1	3503 D 1	4441 A 2
2454 C 2	3437 B 1	3504 C 1	4442 B 2
2455 C 2	3438 B 1	3505 C 1	4443 D 1
2456 D 2	3439 D 1	3507 B 2	4444 B 1
2460 A 1	3440 B 1	3509 C 2	4445 D 1
2461 B 1	3441 B 1	3510 C 2	4446 D 2
2462 B 1	3443 D 1	3511 C 2	4481 B 2
2463 C 1	3444 D 1	3520 C 2	6401 D 1
2465 C 1	3445 D 1	3521 C 2	6403 C 2
2470 C 2	3446 D 1	3523 C 2	6405 C 2
2471 C 1	3447 D 1	3524 D 2	6407 D 1
2472 C 2	3448 D 1	3525 C 2	7401 B 2
2473 C 2	3449 D 1	3526 C 1	7402 B 1
2474 C 2	3450 C 1	3527 C 1	7404 C 1
2475 C 1	3451 C 1	3528 C 1	7405 D 1
2476 C 1	3452 D 1	3529 C 1	7406 C 1
2477 C 1	3453 C 1	3530 C 1	7407 B 1
2478 C 1	3454 C 1	3531 C 1	7408 C 1
2479 C 1	3455 C 1	3532 C 1	7409 C 1
2480 B 1	3456 C 1	4400 A 1	7410 B 1
2481 D 2	3457 B 2	4401 B 2	7413 C 2
2482 D 2	3458 B 2	4402 C 2	7415 D 2
2483 D 2	3459 B 2	4403 C 1	7416 C 1
3401 D 2	3460 B 2	4404 B 1	7417 C 2
3402 B 2	3461 B 2	4405 A 2	7418 C 2
3403 B 2	3462 D 1	4406 D 2	7419 D 1
3404 B 2	3463 C 1	4407 D 2	7420 C 2
3405 B 2	3464 D 1	4408 D 2	7421 D 1
3406 B 2	3467 C 2	4409 C 2	7422 D 1
3407 B 2	3468 C 2	4410 C 1	7423 D 1
3408 A 2	3469 C 2	4411 C 1	....
3409 B 2	3470 B 1	4412 B 2	


AE2
POWER SUPPLY + AMPLIFIER + STANDBY CIRCURTRY
MAINS SWITCH
1315
1316
1317
1318
Mains connector
5311
LC121503-PCT
9323
9321
9313
POWER SUPPLY PANEL
t fuse
23V
220V
5313
MAIN TRANSFORMER
5312
STANDBY TRANSFORMER
1N4002
1N4148
BC548C
BC558C
AN7164
SDBY
I/P
I/P-
GND
I/P2-
RIPP
O/P1
BS1
GND_1
O/P2
BS2
VCC
STBY_COM!
AUDIO_IN!
STANDBY!
KICK START
1320
T-2.5A
6264
E3SBA20
7275
L7808
9212
9270
1264
1265
1375
1376
SUPPLY
DC STATUS SIGNAL
AC STATUS SIGNAL
LED PANEL
ST/BY
ON
RED
GREEN
1361
6360
6361
1261
7265
BC558B
7266
R = MUTE
L = MUTE
MUTE
9V3 = CINCH OUT
0V4 = CINCH IN
CINCH OUT = 9V3
CINCH IN = 0V4
1251
TRB11-0996
1262
1260
1250
7260 B NJM2068DD
7260 A NJM2068DD
7262 A LM393N
7262 B LM393N
LOW LEVEL DETECTOR
WIRELESS MODE = WIRED MODE = 1V3
9003
_V MEASURED IN NORMAL OPERATION
(_V) MEASURED IN STANDBY

1250	M 3	9212	D14
1251	L 2	9270	D14
1260	M 4	9313	D 5
1261	I19	9321	D 4
1262	K 4	9323	D 2
1263	E10		
1264	A18		
1265	C19		
1313	E 9		
1315	B 3		
1316	B 2		
1317	B 2		
1318	D 1		
1320	C11		
1361	I20		
1375	A19		
1376	A21		
2260	G17		
2261	G15		
2262	G13		
2264	H19		
2265	D11		
2266	D12		
2268	L11		
2269	L10		
2271	N 7		
2272	G16		
2273	C16		
2274	C14		
2275	A17		
2276	B17		
2277	B14		
2278	B14		
2279	A12		
2280	M16		
2281	A16		
2282	A18		
2283	B16		
2284	A14		
2285	B14		
2286	C14		
2287	M11		
2288	M13		
2289	L13		
2290	N 9		
2291	M 5		
2292	K 7		
2293	I 8		
2295	L12		
2296	M17		
2297	A19		
2298	A20		
2300	A20		
2301	A20		
2302	L14		
2310	G 7		
2311	H 7		
2312	A13		
2313	M16		
2314	D12		
2315	I 9		
3260	G17		
3261	G17		
3263	D15		
3264	D17		
3265	C17		
3269	L10		
3270	M11		
3271	M10		
3272	M13		
3273	M12		
3274	L14		
3275	L16		
3276	N17		
3277	N16		
3278	L16		
3279	N 8		
3280	M16		
3281	N 9		
3282	N 9		
3283	I18		
3284	L18		
3285	I17		
3286	J18		
3287	J19		
3288	N 7		
3289	N 7		
3290	M13		
3291	L12		
3292	A12		
3293	A17		
3294	B17		
3295	B13		
3296	C13		
3297	C13		
3298	C13		
3301	N 6		
3303	K 8		
3304	L 6		
3305	K 6		
3306	I 8		
3307	I 8		
3308	I 9		
3311	H 1		
3312	I10		
3313	H11		
3314	I11		
3315	I11		
3316	I12		
3317	K 6		
3318	N 3		
3319	A13		
3320	L 7		
3321	M 8		
3323	B20		
3324	B20		
5310	G 3		
5311	D 3		
6260	D15		
6264	D11		
6265	C17		
6266	N16		
6267	G14		
6268	G14		
6270	C14		
6271	M14		
6272	L14		
6273	L16		
6274	L15		
6275	L 6		
6276	K 8		
6277	I 8		
6278	I 7		
6310	G 2		
6311	G 2		
6312	G 6		
6313	G 6		
6314	G 7		
6315	G 7		
6360	I20		
6361	I20		
7260	L12		
7260	L11		
7262	L15		
7262	M17		
7265	I17		
7266	I18		
7267	A15		
7268	N 8		
7269	N 9		
7270	L 8		
7271	L 6		
7272	I10		
7273	I11		
7274	I12		
7275	F14		
7310	H 2		
9003	K19		

Wireless Dolby / Drahtlos-Dolby / Dolby sans fil

1700	C 1
1710	B 3
1765	J 9
1791	E21
2706	B 6
2710	B 8
2712	B10
2714	B12
2715	B12
2716	B13
2718	E 9
2720	E14
2731	F15
2732	G16
2750	G 4
2751	K10
2752	J 2
2753	J 2
2754	G 3
2755	J 2
2770	H14
2771	I12
2772	I12
2773	J12
2774	J12
2779	H15
2780	J15
2781	J16
2782	H17
2783	I17
2790	G19
2791	G20
2792	F20
2794	J16
3701	D 4
3702	D 5
3703	C 2
3704	D 4
3705	B 7
3706	B 7
3707	B 7
3708	C 7
3709	C 6
3710	C 7
3711	A 8
3712	B10
3716	B14
3717	E11
3719	E12
3720	E13
3721	E13
3729	F13
3730	F13
3731	G13
3732	F15
3733	G15
3734	F16
3735	G16
3736	F16
3741	G12
3750	G 4
3753	J 2
3754	J 3
3755	I 2
3756	I 7
3757	H 7
3765	J10
3766	J 8
3767	J 7
3770	H14
3771	I12
3772	J12
3779	I16
3780	I16
3781	I16
3782	I17
3783	I18
3784	J20
3785	I18
3790	H20
3791	H20
3793	I19
3794	E20
5705	C 2
5706	C 6
5707	C 8
5710	A11
5730	F14
5750	K 3
6710	B15
6751	J 8
6752	J 2
6770	H13
7707	C 7
7710	B 8
7735	F16
7750	H 3
7755	J 3
7770	H13
7780	K16
7780	I16
7784	J19
7789	H19
7790	F19

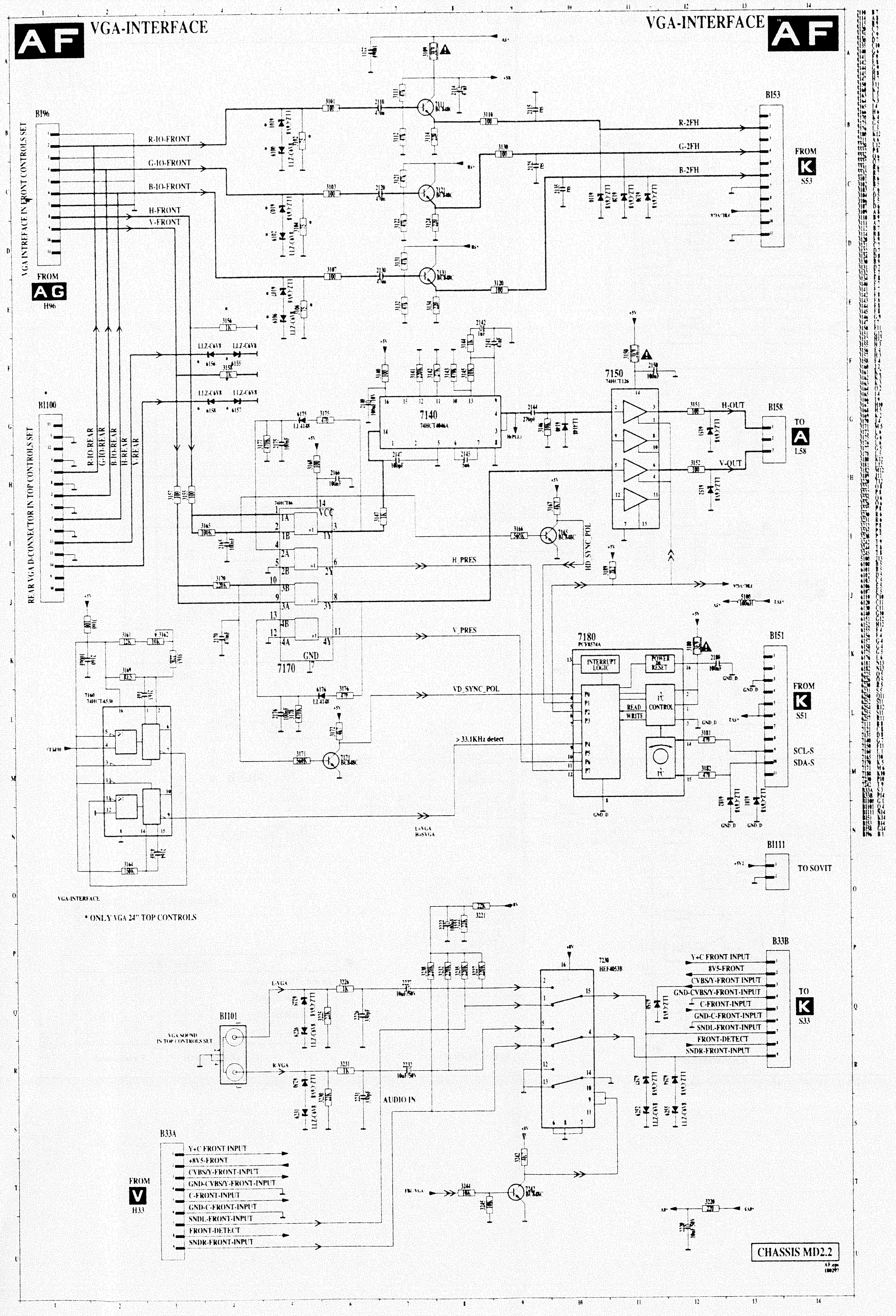

AE3 433MHz MONO RECEIVER
AE3
1710 RECIEVER
VCC
OSC
SYNTH.
MT
GND
5705
10,7 MHz TRANSMITTER ON
0 MHZ TRANSMITTER OFF
7707 BFS19
5706 MS3
5707 MS3
3V7
0V9
7710 LA1805
VCC
FM IF
Det
Post Amp
Level Det
Muting
AM IF
AGC
RF Amp
Mix
Reg
OSC
Tuning Indic. Drive
Pilot Det
Trig
Stereo Ind Dr
FF
Phase Det
VCO
Decoder
Stereo SW
GND
5710 TOKO7x7
6710 BAV70
5730 TOKO MPX
7735 BC848B
7750 MC68HC05
VDD
RAM
ROM
PORT B
CPU CONTROL
RESET
IRQ
COP WATCHDOG AND ILLEGAL ADDRESS DETECT
MULTIFUNCTION TIMER
PORT A
OSC.
DIVIDE BY TWO
OSC1
OSC2
GND
5750 CST4.00
7755 BC849B
6752 BAS16
MICROPROCESSOR
1765 7 P SWITCH
CHANNEL SELECTION SWITCH
7770 NE572
6770 C8V2
VCC
ΔG
GND
EXPANDER
not used
7780 B NJM4560
7780 A NJM4560
not used
7790 78L06
9V3 = cinch out (wireless mode)
0V4 = cinch in (wireless mode)
7783 BC848B
7784 BC848B
MUTE
(_ V) MUTE STATE
+12V
+12VB
6V
6VA
6VB
5V2
LF
A
R

Schematic used for units 3104 217 04640
3104 217 04670
3104 217 05210
3104 217 05220

■	3729	3730	3731	3741	3756	3757
For unit 3104 217 04640 use	-	X	X	-	X	-
3104 217 04670	-	X	X	-	-	X
3104 217 05210	X	-	-	X	X	-
3104 217 05220	X	-	-	X	-	X

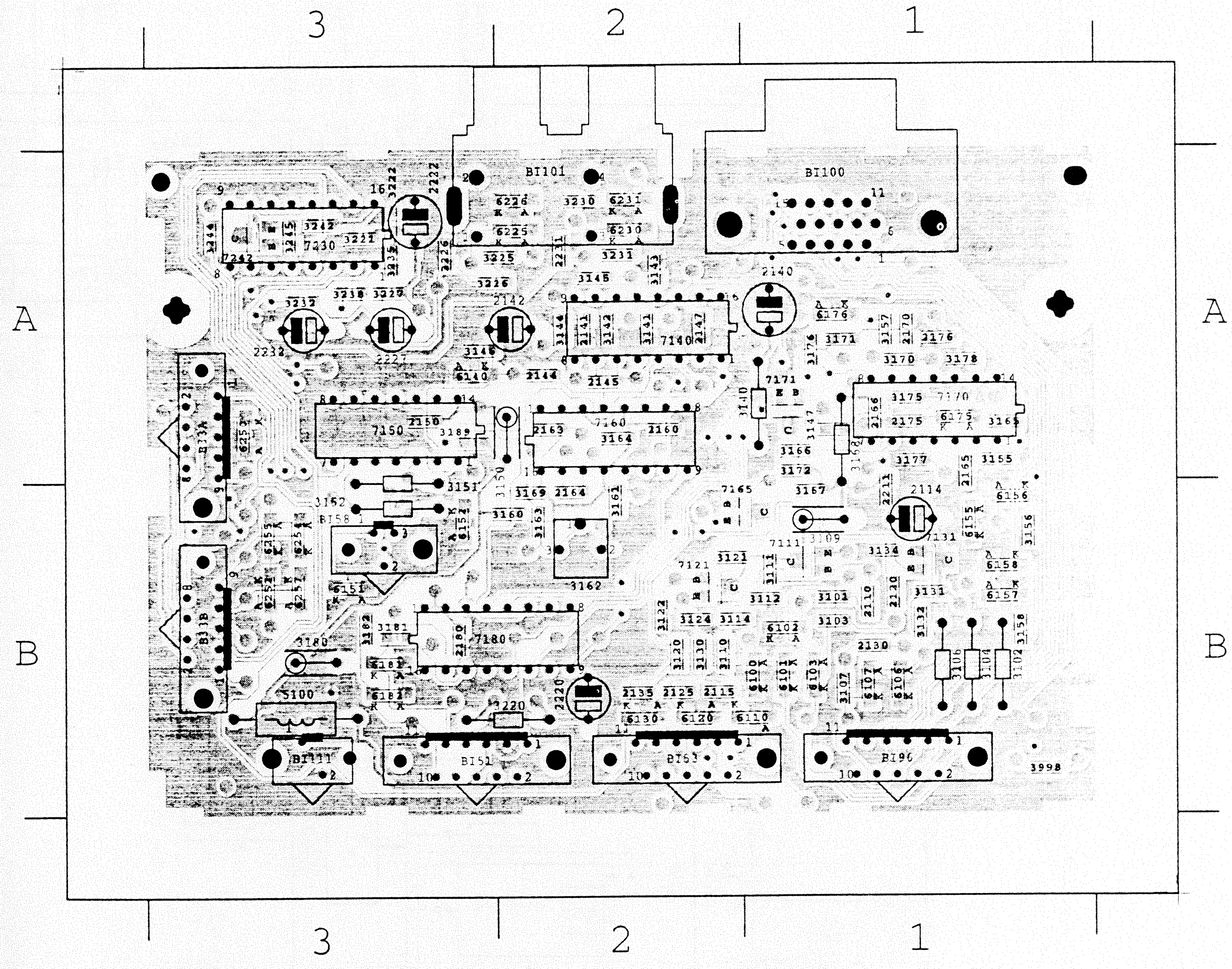
- = item not inserted X = item inserted

VGA interface panel / VGA-Schnittstellen-platine / Platine VGA-interface

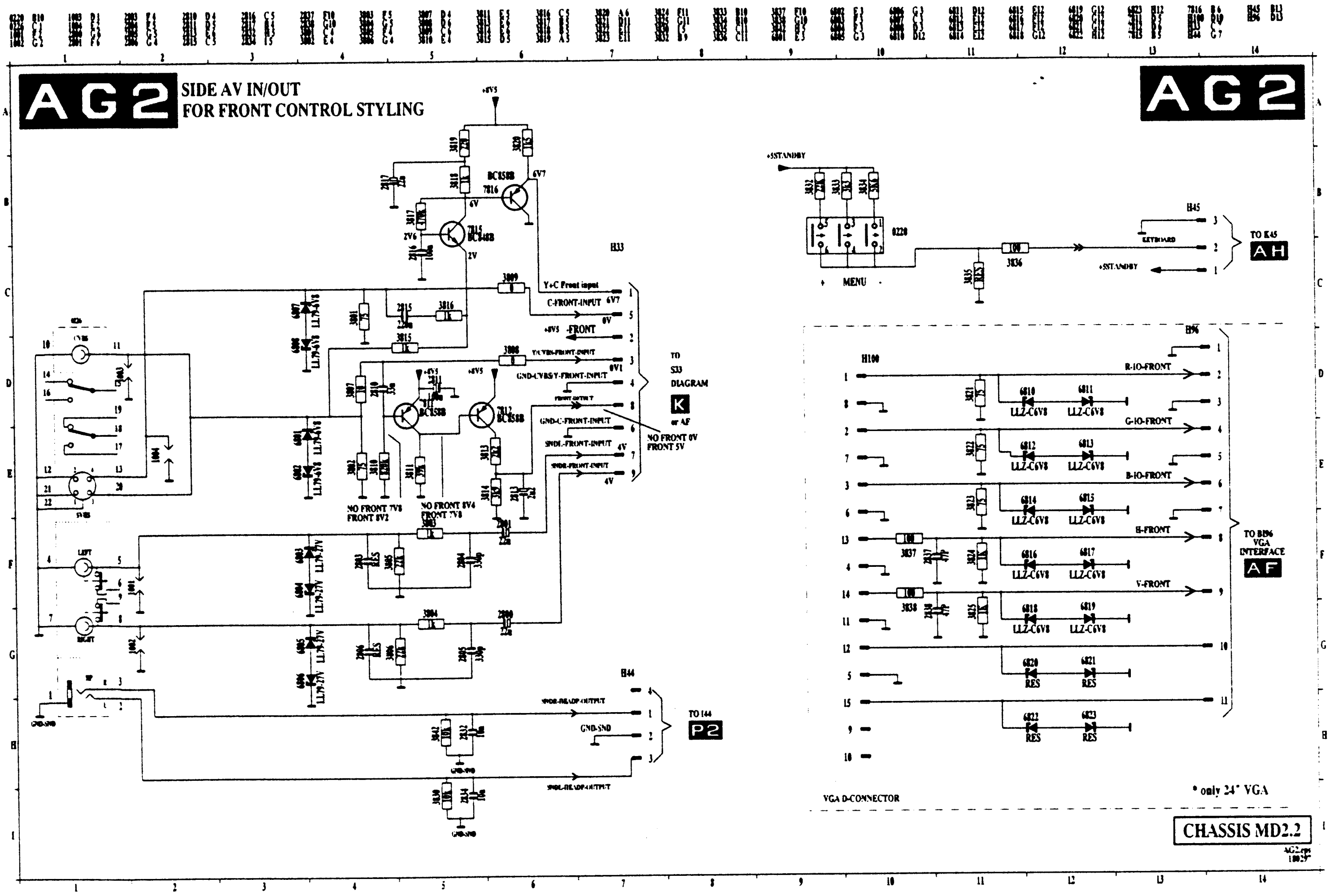

AF VGA-INTERFACE
VGA-INTERFACE AF
BI96
R-IO-FRONT
G-IO-FRONT
B-IO-FRONT
H-FRONT
V-FRONT
VGA INTERFACE IN FRONT CONTROLS SET
FROM AG H96
BI53
R-2FH
G-2FH
B-2FH
FROM K S53
BI100
R-IO-REAR
G-IO-REAR
B-IO-REAR
H-REAR
V-REAR
REAR VGA D-CONNECTOR IN TOP CONTROLS SET
7140
7150
H-OUT
V-OUT
BI58
TO A I58
H_PRES
V_PRES
VD_SYNC_POL
HD_SYNC_POL
7170
GND
VCC
7180
INTERRUPT LOGIC
POWER RESET
READ WRITE
I²C CONTROL
>33.1KHz detect
BI51
FROM K S51
SCL-S
SDA-S
BI111
TO SOVIT
* ONLY VGA 24" TOP CONTROLS
B33B
Y+C-FRONT-INPUT
8VS-FRONT
CVBS/Y-FRONT-INPUT
GND-CVBS/Y-FRONT-INPUT
C-FRONT-INPUT
GND-C-FRONT-INPUT
SNDL-FRONT-INPUT
FRONT-DETECT
SNDR-FRONT-INPUT
TO K S33
BI101
VGA SOUND IN TOP CONTROLS SET
L-VGA
R-VGA
AUDIO IN
B33A
FROM V H33
CHASSIS MD2.2

VGA interface panel / VGA-Schnittstellenplatine / Platine VGA-interface

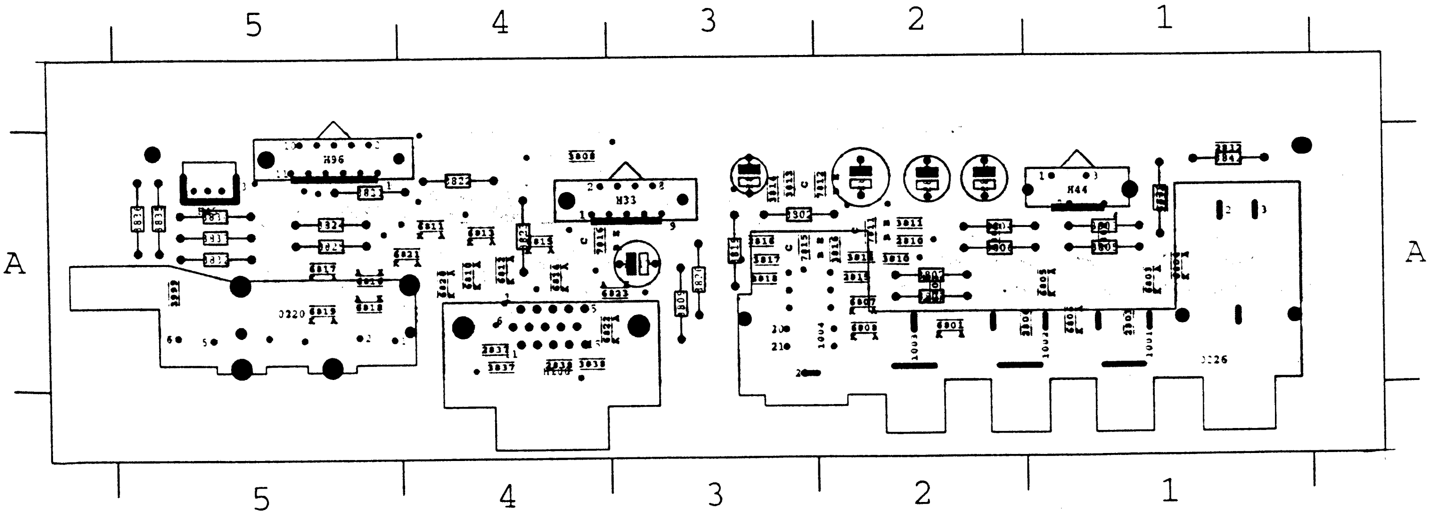
2110 B 1	2150 A 3	2226 A 3	3112 B 1	3143 A 2	3161 B 2	3176 A 1	3230 A 2	6103 B 1	6175 A 1	7111 B 1	B33B B 3
2114 B 1	2160 A 2	2227 A 3	3114 B 2	3144 A 2	3162 B 2	3177 A 1	3231 A 2	6106 B 1	6176 A 1	7121 B 2	BI51 B 3
2115 B 2	2163 A 2	2231 A 2	3120 B 2	3145 A 2	3163 B 2	3178 A 1	3232 A 3	6107 B 1	6181 B 3	7131 B 1	BI53 B 2
2120 B 1	2164 B 2	2232 A 3	3121 B 2	3146 A 3	3164 A 2	3180 B 3	3235 A 3	6110 B 1	6182 B 3	7140 A 2	BI58 B 3
2125 B 2	2165 A 1	3101 B 1	3122 B 2	3147 A 1	3165 A 1	3181 B 3	3238 A 3	6120 B 2	6225 A 2	7150 A 3	BI96 B 1
2130 B 1	2166 A 1	3102 B 1	3124 B 2	3150 A 2	3166 A 1	3182 B 3	3242 A 3	6130 B 2	6226 A 2	7160 A 2	BI100 A 1
2135 B 2	2170 A 1	3103 B 1	3130 B 2	3151 B 3	3167 B 1	3189 A 3	3244 A 3	6140 A 3	6230 A 2	7165 B 1	BI101 A 3
2140 A 1	2175 A 1	3104 B 1	3131 B 1	3152 B 3	3168 A 1	3220 B 2	3245 A 3	6151 B 3	6231 A 2	7170 A 1	BI111 B 3
2141 A 2	2176 A 1	3106 B 1	3132 B 1	3155 A 1	3169 B 2	3221 A 3	3998 B 1	6152 B 3	6250 A 3	7171 A 1	
2142 A 2	2180 B 3	3107 B 1	3134 B 1	3156 B 1	3170 A 1	3222 A 3	5100 B 3	6155 B 1	6252 B 3	7180 B 3	
2144 A 2	2211 B 1	3109 B 1	3140 A 1	3157 A 1	3171 A 1	3225 A 2	6100 B 1	6156 B 1	6254 B 3	7230 A 3	
2145 A 2	2220 B 2	3110 B 2	3141 A 2	3158 B 1	3172 A 1	3226 A 2	6101 B 1	6157 B 1	6255 B 3	7242 A 3	
2147 A 2	2222 A 3	3111 B 1	3142 A 2	3160 B 2	3175 A 1	3227 A 3	6102 B 1	6158 B 1	6257 B 3	B33A A 3	


3
2
1
A
B
BI101
BI100
7140
7150
7160
7170
7180
BI111
BI51
BI53
BI96
3998

Front input/output panel with VGA input (front control styling) / Fronteingangs-/Ausgangsplatine mit VGA-Eingang / Platine frontale entrée/sortie avec entrée VGA

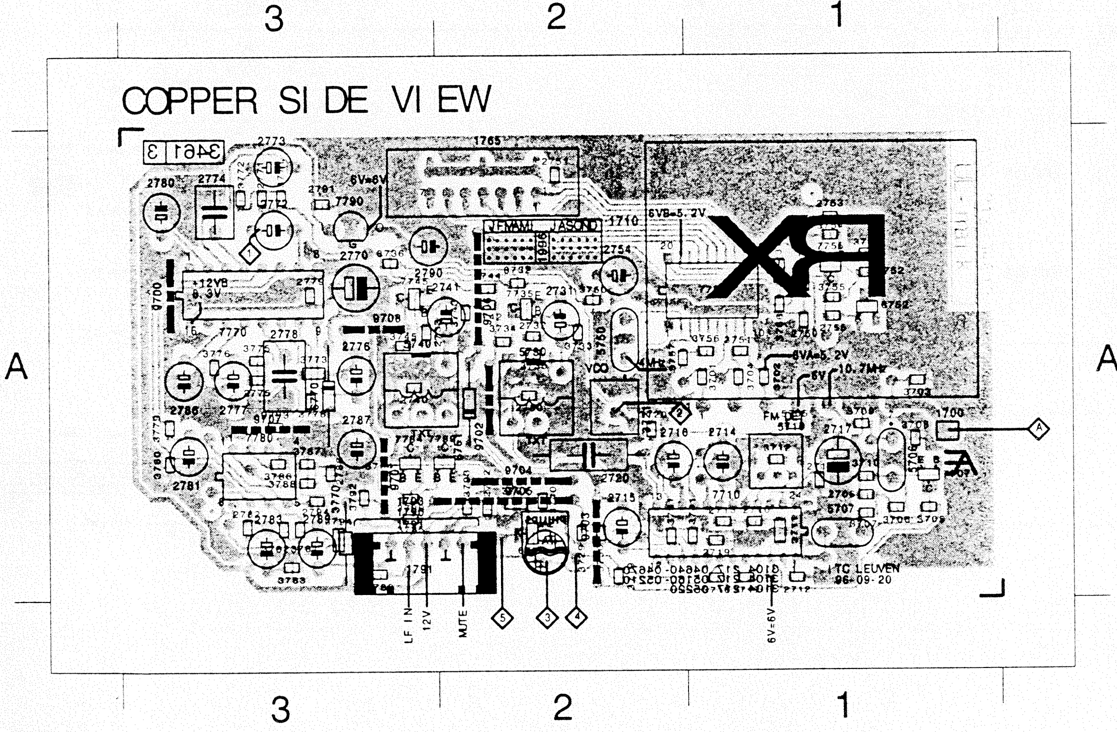

AG2
SIDE AV IN/OUT
FOR FRONT CONTROL STYLING
AG2
+8V5
BC858B
7816
7815
BC848B
6V7
6V
2V6
2V
H33
3809
Y+C Front input
C-FRONT-INPUT
+8V5 -FRONT
Y-CVBS-FRONT-INPUT
GND-CVBS/Y-FRONT-INPUT
FRONT OUTPUT
GND-C-FRONT-INPUT
SNDL-FRONT-INPUT
SNDR-FRONT-INPUT
TO
S33
DIAGRAM
K
or AF
NO FRONT 0V
FRONT 5V
NO FRONT 7V8
FRONT 8V2
NO FRONT 8V4
FRONT 7V8
7811
BC858B
7812
BC858B
LL79-6V8
LL79-27V
CVBS
SVHS
LEFT
RIGHT
HP
GND-SND
H44
SNDR-HEADP-OUTPUT
SNDL-HEADP-OUTPUT
TO 144
P2
+5STANDBY
0220
+ MENU -
H45
KEYBOARD
+5STANDBY
TO K45
AH
3836
3835
H96
H100
R-IO-FRONT
G-IO-FRONT
B-IO-FRONT
H-FRONT
V-FRONT
LLZ-C6V8
RES
TO B96
VGA
INTERFACE
AF
VGA D-CONNECTOR
* only 24" VGA
CHASSIS MD2.2
A
B
C
D
E
F
G
H
I
1
2
3
4
5
6
7
8
9
10
11
12
13
14

0220 A 5	2804 A 1	2813 A 3	2834 A 1	3803 A 1	3808 A 4	3814 A 3	3819 A 3	3824 A 5	3834 A 5	3842 A 1	6804 A 1	6810 A 4	6815 A 4	6820 A 4	7812 A 2	H45 A 5
0226 A 1	2805 A 2	2815 A 2	2837 A 4	3804 A 1	3809 A 3	3815 A 2	3820 A 3	3825 A 5	3835 A 5	3839 A 5	6805 A 1	6811 A 4	6816 A 5	6821 A 4	7815 A 3	H96 A 5
2800 A 2	2806 A 2	2816 A 3	2838 A 4	3805 A 1	3810 A 2	3816 A 2	3821 A 5	3830 A 1	3836 A 5	6801 A 2	6806 A 1	6812 A 4	6817 A 5	6822 A 4	7816 A 4	H100 A 4
2801 A 2	2810 A 2	2817 A 3	3801 A 2	3806 A 2	3811 A 2	3817 A 3	3822 A 4	3832 A 5	3837 A 4	6802 A 2	6807 A 2	6813 A 4	6818 A 5	6823 A 3	H33 A 3	
2803 A 1	2811 A 2	2832 A 1	3802 A 3	3807 A 2	3813 A 3	3818 A 3	3823 A 4	3833 A 5	3838 A 4	6803 A 1	6808 A 2	6814 A 4	6819 A 5	7811 A 2	H44 A 1	


5
4
3
2
1
A
A
H96
H33
H44
0220
0226
H100
7815
7816

Wireless Dolby / Drahtlos-Dolby / Dolby sans fil

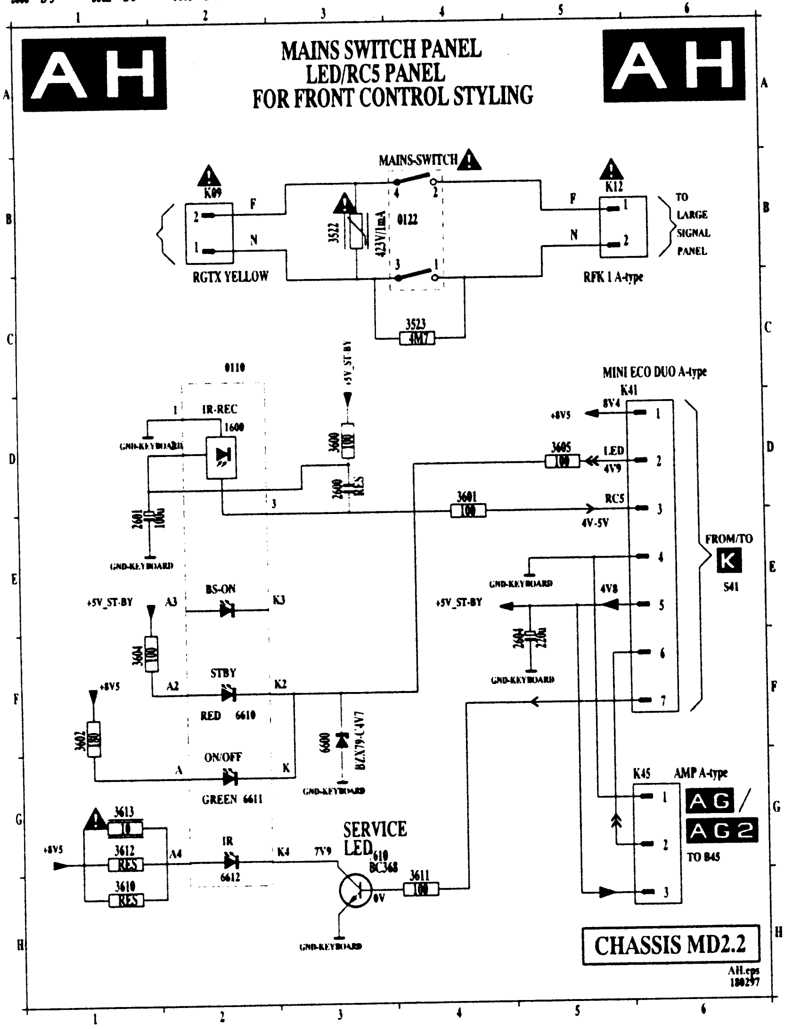
9708 A 3	9703 A 2	7780 A 3	5750 A 2	5706 A 1	2787 A 3	2778 A 3	2772 A 3	2720 A 2	1793 A 3	1700 A 1
	9704 A 2	7790 A 3	6751 A 2	5707 A 1	2789 A 3	2780 A 3	2773 A 3	2731 A 2	2714 A 1	1710 A 1
	9705 A 2	9700 A 3	6770 A 3	5710 A 1	2790 A 3	2781 A 3	2774 A 3	2741 A 2	2715 A 2	1765 A 2
	9706 A 2	9701 A 3	7710 A 1	5730 A 2	3721 A 2	2783 A 3	2776 A 3	2754 A 2	2716 A 2	1790 A 3
	9707 A 3	9702 A 2	7770 A 3	5740 A 3	3770 A 3	2786 A 3	2777 A 3	2770 A 3	2717 A 1	1791 A 3


3
2
1
A
A
COPPER SIDE VIEW
3461
2773
1765
2780
2774
2791
6V=6V
7790
JFMAMJ
JASOND
1996
1710
6VB=5.2V
2753
2770
2790
2741
2754
2752
+12VB
9.3V
9700
2731
3750
6752
9708
2778
2776
7770
3740
5730
VCO
6VA=5.2V
10.7MHz
5V
3793
2779
2786
2777
9707
2787
2718
2714
FM DET
2717
1700
7780
3787
3788
2781
9704
3706
2730
2715
7710
2705
5707
2783
2789
1791
3706
5709
ITC LEUVEN
96-09-20
LF IN
12V
MUTE
6V=6V
3
2
1

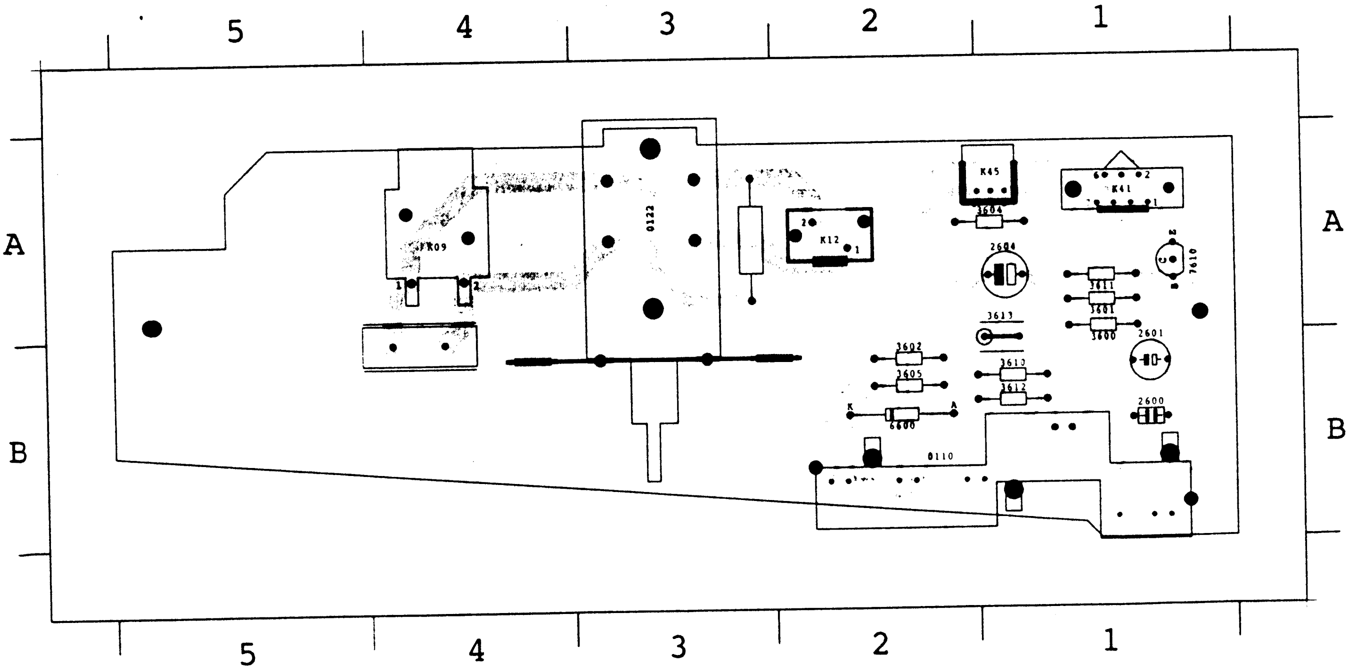
2706 A 1	3716 A 1	3781 A 3
2710 A 1	3717 A 1	3782 A 3
2712 A 1	3719 A 2	3783 A 3
2713 A 1	3720 A 2	3784 A 3
2718 A 1	3729 A 2	3785 A 3
2719 A 1	3730 A 2	3786 A 3
2730 A 2	3731 A 2	3787 A 3
2732 A 2	3732 A 2	3788 A 3
2733 A 3	3733 A 2	3789 A 3
2740 A 3	3734 A 2	3790 A 3
2750 A 1	3735 A 2	3791 A 2
2751 A 2	3736 A 3	3792 A 3
2752 A 1	3740 A 2	3793 A 2
2753 A 1	3741 A 1	3794 A 3
2755 A 1	3742 A 2	5705 A 1
2771 A 3	3743 A 2	6710 A 2
2775 A 3	3744 A 2	6752 A 1
2779 A 3	3745 A 3	7707 A 1
2782 A 3	3750 A 2	7735 A 2
2788 A 3	3751 A 1	7745 A 3
2791 A 3	3753 A 1	7750 A 1
2792 A 2	3754 A 1	7755 A 1
2793 A 3	3755 A 1	7784 A 3
2794 A 3	3756 A 1	7789 A 2
3701 A 1	3757 A 2	
3702 A 1	3765 A 1	
3703 A 1	3766 A 1	
3704 A 1	3767 A 1	
3705 A 1	3771 A 3	
3706 A 1	3772 A 3	
3707 A 1	3773 A 3	
3708 A 1	3775 A 3	
3709 A 1	3776 A 3	
3710 A 1	3778 A 3	
3711 A 1	3779 A 3	
3712 A 1	3780 A 3	

Mains input & RC5 panel (front control styling) / Netzeingang & RC5-Platine (Frontbedienung)/ Platine entrée secteur & RC5 (style commande de sur le haut)

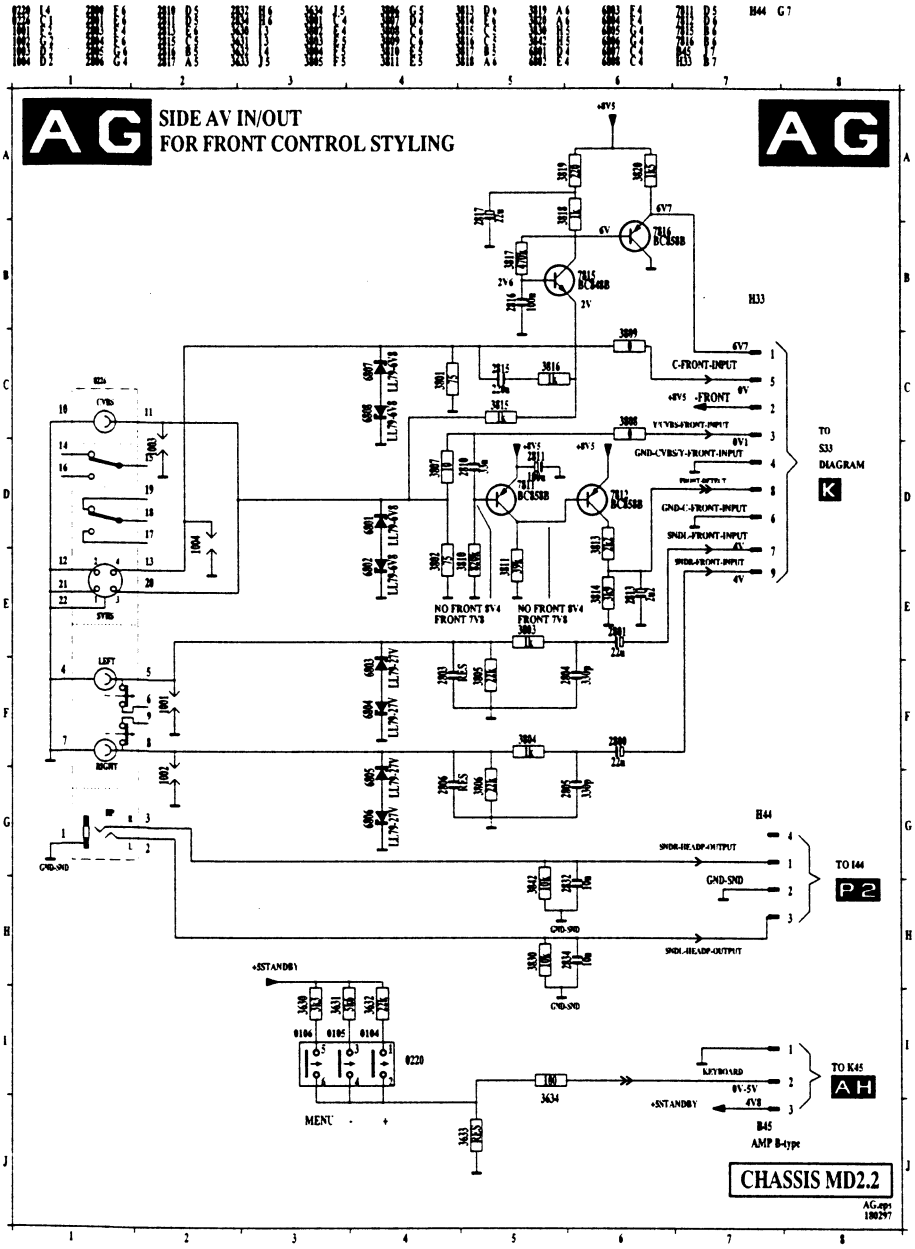
0110	C 2	2601	D 1	3523	C 4	3602	F 1	3610	H 1	3613	G 1	K09	B 2	K45	G 5						
0122	B 4	2604	F 5	3600	D 3	3604	F 1	3611	H 4	6600	F 3	K12	B 5								
2600	D 3	3522	B 3	3601	D 4	3605	D 5	3612	G 1	7610	G 3	K41	D 5								

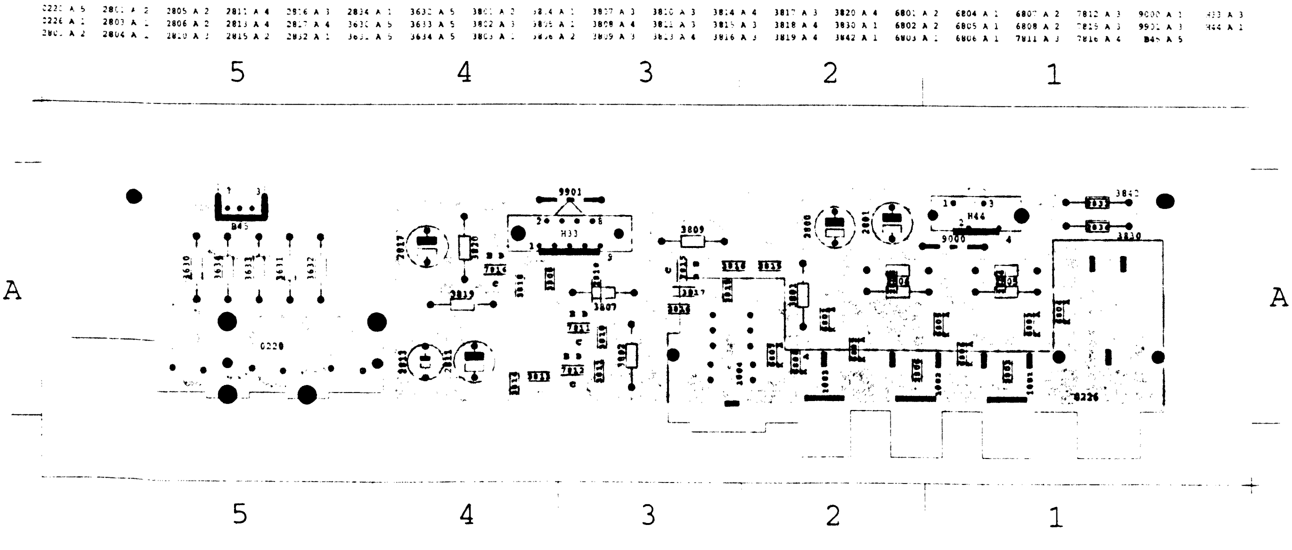

1
2
3
4
5
6
A
B
C
D
E
F
G
H
AH
MAINS SWITCH PANEL
LED/RC5 PANEL
FOR FRONT CONTROL STYLING
AH
MAINS-SWITCH
K09
F
N
RGTX YELLOW
3522
423V/1mA
0122
4
2
3
1
K12
F
N
RFK 1 A-type
TO
LARGE
SIGNAL
PANEL
3523
4M7
+5V_ST-BY
0110
IR-REC
1600
GND-KEYBOARD
3600
100
2600
RES
2601
100u
GND-KEYBOARD
MINI ECO DUO A-type
K41
8V4
+8V5
3605
100
LED
4V9
3601
100
RC5
4V-5V
FROM/TO
K
S41
GND-KEYBOARD
4V8
+5V_ST-BY
2604
220u
GND-KEYBOARD
BS-ON
A3
K3
3604
100
+8V5
STBY
A2
K2
RED 6610
6600
BZX79-C4V7
3602
180
ON/OFF
A
K
GREEN 6611
GND-KEYBOARD
K45 AMP A-type
AG/
AG2
TO B45
3613
10
3612
RES
3610
RES
A4
IR
6612
K4
7V9
SERVICE
LED
7610
BC368
0V
3611
100
GND-KEYBOARD
CHASSIS MD2.2
AH.eps
180297

0110	B	2	2600	B	1	2604	A	1	3523	A	3	3601	A	1	3604	A	2	3610	B	2	3612	B	2	6600	B	2	K09	A	4	K41	A	1
0122	A	3	2601	B	1	3522	B	4	3600	A	1	3602	B	2	3605	B	2	3611	A	1	3613	B	1	7610	A	1	K12	A	2	K45	A	1


5
4
3
2
1
A
B
K09
0122
K12
K45
3604
K41
2604
7610
3611
3601
3600
3613
2601
3602
3605
3612
3612
6600
K
A
2600
0110

Front input/output panel (top control styling) / Fronteingangs-/Ausgangsplatine / Platine frontale entrée/sortie


AG
SIDE AV IN/OUT
FOR FRONT CONTROL STYLING
+8V5
7815 BC848B
7816 BC858B
7811 BC858B
7812 BC858B
H33
C-FRONT-INPUT
+8V5 -FRONT
Y/CVBS-FRONT-INPUT
GND-CVBS/Y-FRONT-INPUT
GND-C-FRONT-INPUT
SNDL-FRONT-INPUT
SNDR-FRONT-INPUT
TO S33 DIAGRAM
K
CVBS
SVHS
LEFT
RIGHT
NO FRONT 8V4
FRONT 7V8
H44
SNDR-HEADP-OUTPUT
GND-SND
SNDL-HEADP-OUTPUT
TO 144
P2
+5STANDBY
0106
0105
0104
0220
MENU
-
+
KEYBOARD
TO K45
AH
B45
AMP B-type
CHASSIS MD2.2
AG.eps
180297


0220 A 5
0226 A 1
2801 A 2
2803 A 1
2804 A 1
2805 A 2
2806 A 2
2810 A 3
2811 A 4
2813 A 4
2815 A 2
2816 A 3
2817 A 4
2832 A 1
2834 A 1
3630 A 5
3631 A 5
3632 A 5
3633 A 5
3634 A 5
3801 A 2
3802 A 3
3803 A 1
3804 A 1
3805 A 1
3806 A 2
3807 A 3
3808 A 4
3809 A 3
3810 A 3
3811 A 3
3813 A 4
3814 A 4
3815 A 3
3816 A 3
3817 A 3
3818 A 4
3819 A 4
3820 A 4
3830 A 1
3842 A 1
6801 A 2
6802 A 2
6803 A 1
6804 A 1
6805 A 1
6806 A 1
6807 A 2
6808 A 2
7811 A 3
7812 A 3
7815 A 3
7816 A 4
9000 A 1
9901 A 3
B45 A 5
H33 A 3
H44 A 1
5
4
3
2
1
A
B45
9901
H33
H44
0220
0226

8. Electrical adjustments

General alignment conditions

All electrical adjustments/alignments should be made under the following conditions:

- ★ Power supply voltage: 220-240V ± 10%; 50-60 Hz ± 5%.
- ★ Warm-up time = 10 minutes.
- ★ Voltages and oscillograms are measured in relation to tuner earth (with exception to the voltages on the primary side of the power supply). **Never** use the cooling fins/plates as earth.
- ★ Test probe: Ri > 10 MΩ; Ci ≤ 20 pF.

8.1 Large signal panel adjustments [A]

8.1.1 *+141V power supply voltage*

- Connect a voltmeter to the positive side of C2569.
- Using **R3559** adjust the power supply voltage to +141V ± 0V5.

8.1.2 *Focusing*

This is adjusted using the focus potentiometer (uppermost on the line transformer).

8.1.3 *Vg2 adjustment*

- Use the Service Alignment Menu to switch on the Vg2 test pattern (see paragraph 8.4).
- With the aid of a DC voltmeter (Ri > 1MΩ) measure the DC voltages on pins 8 of the RGB output amplifiers IC7330, IC7340 and IC7350 on the picture tube panel.
- Determine the highest of the three voltages using the Vg2 (SCREEN) potentiometer on the line output transformer and adjust it to 155V ± 2V.

8.1.4 *Horizontal centring (DC offset)*

- Use the Service Alignment Menu (see paragraph 8.94) to switch on the geometry test pattern and then select in sequence: Alignments, Geometry, Test pattern on, H-Shift.
- Use H-Shift to adjust the picture in such a manner that the test pattern appears in the middle of the picture tube (video centrallin in the deflection window).
- If the adjustment range of the H-Shift is insufficient, the deflection window can be moved using the jumpers on the DC-shift panel.
- If the DC-shift panel is used the video must then be placed in the middle of the deflection window again via H-Shift.

Remarks:
The 'Horizontal Shift' adjustment in the Service Alignment Menu **cannot** be adjusted using the internal test pattern. An external test pattern from a generator or an aerial is required for this purpose.

8.2 Small signal panel adjustments [K]

8.2.1 *Y/CVBS level*

- Feed in a CVBS grey scale signal with a nominal amplitude (between black and white) to pin 20 of EXT1 and select the picture on EXT1.
- Use **R3503** on the SSP to adjust the amplitude of the signal to 345mV$_{pp}$ (between black and white) on pin 8 of IC7500 (TDA4780) on the SSP (K).

8.3 TXT + control module [J3] adjustments

8.3.1 *24 MHZ crystal for Text DualScreen*

- Select a programme using teletext.
- Activate the Text DualScreen mode.
- Adjust **L5465** so that the teletext half is stable on the screen and when turning to both the left and right some margin remains.

8.4 IF module adjustments [L]

8.4.1 *AGC (Automatic Gain Control) take-over point adjustment*

Rough adjustment:

- In case the picture from a local transmitter is distorted, adjust the AGC using **R3140** until the picture is no longer distorted.

Fine adjustment:

- Connect a video generator (e.g. PM5518) to the aerial input.
- Select a 475.25 MHz colour bar without sound.
- Set the video generator to its highest level.
- Select the Service Default Mode by means of the <DEFAULT> key on the DST or by briefly shorting the SERVICE DEFAULT MODE pins.
- Connect an oscilloscope to the output of the tuner (pin 17).
- Adjust the AGC take over point using **R3140** so that the oscilloscope indicates 0.5V$_{pp}$.

8.4.2 *AFC (Automatic Frequency Control) adjustment*

- Select 'MANUAL' adjustment in the installation menu.
- Select a transmitter frequency of 175.25 MHz (upper left on the screen) by means of the digit keys and the PROGRAM +/- keys. Once the frequency has been accurately adjusted using PROGRAM +/-, the set is forced to that frequency and the AFC adjustment is switched off.
- Connect a video generator with a colour bar and a frequency of 175.25 MHz to the aerial input.
- In a 'Multi West Europe' set (-/12) select system BG on the video generator and system 'WEST-EUROPE' in the installation menu.
- In a 'Multi French' set (-/05/19) select system L on the video generator and system 'FRANCE' in the installation menu.
- In a 'Multi East Europe' set (-/58) select system DK on the video generator and system 'EAST-EUROPE' in the installation menu.
- Connect a multimeter to the AFC output on pin 12S59.
- Use **L5165** to adjust the AFC to 2V6.

8.4.3 *34.4 MHz adjustment for 'Multi West Europe' (BGLM -/12) and 'Multi East Europe' (BGLMDK -/58) sets*

- Select a program with system 'AMERICA' or go to the installation menu and make a program with system 'AMERICA'.
- Connect a video generator to the aerial input.
- Select system NTSC M with 1kHz sound and a fully black picture.
- Connect an oscilloscope to connector 10S59 (CVBS_TERR) and trigger line-frequent.
- Adjust the 34.4 MHz filter using **L5101** so that the sound carrier wave at 34.4 receives maximum suppression (minimum amplitude of the oscillation).

8.4.4 *40.4 MHz adjustment for Multi France sets (BGLL'I -/05/19)*

- Select a program with system 'FRANCE', but not a program in the VHF1 band (so select a SECAM L transmitter).
- Connect a video generator to the aerial input.
- Select system SECAM L with 1kHz sound and a completely black picture.
- Connect an oscilloscope to connector 10S59 (CVBS_TERR) and trigger line-frequent.
- Turn the 40.4 MHz TOKO **L5102** fully to the right.
- Now turn the TOKO slowly to the left until:
  - ★ the amplitude of the subcarrier begins to increase, or
  - ★ peaks appear in top of the signal.

8.5 Audio Power Supply Module adjustments [AB]

8.5.1 *+16V supply voltage*

- Connect a voltmeter to the positive side of C2307.
- Switch off the load (mute the sound).
- Using **R3311** adjust the supply voltage to +16V5.

8.6 VDS adjustment (Video DualScreen) module [AC]

8.6.1 *AGC (Automatic Gain Control) transfer point adjustment*

Coarse adjustment:

- If the picture of a local transmitter is distorted, adjust the AGC using **R9H5** until the picture has no distortion.

Fine adjustment:

- Connect a video generator (e.g. PM5518) to the aerial input.
- Select a colour bar at 475.25 MHz without sound.
- Drive the video generator to full power.
- Select the Service Default Mode using the <DEFAULT> key on the DST or by briefly short-circuiting the SERVICE DEFAULT MODE pins.
- Select VDS mode and select on the right-hand screen the same programme as on the left-hand screen.
- Connect an oscilloscope to the tuner output (pin 17).
- Using **R9H5** adjust the AGC transfer point so that the oscilloscope reads 0.5V$_{pp}$.

8.6.2 *AFC (Automatic Frequency Control) adjustment*

- Switch off the VDS mode and select 'MANUAL' tuning in the installation menu of the main screen.
- Select a transmitter frequency of 175.25 MHz (top left in the screen) using the digit keys and the PROGRAM +/- keys. As soon as the frequency is set accurately using the PROGRAM +/- the main and, as a result of this, the VDS tuner, are forced to that frequency and the AFC control is switched off.
- Save these settings and exit the installation menu.
- Connect a video generator with a colour bar and a frequency of 175.25 MHz to the aerial input.
- Select system BG on the video generator and system 'WESTERN EUROPE' in the installation menu.
- Select VDS mode and on the right-hand screen select the same programme as on the left-hand screen.
- Connect a multimeter to the AFC output on pin 23 of IC9R (IF modulator of the VDS modules).
- Using **L9F7** adjust the AFC to 2V6.

8.6.3 *40.4 MHz adjustment for (BGLL'I)*

- Select a programme with system 'FRANCE', however, not a programme in the VHF1 band (therefore select a SECAM L transmitter), for example 475.25 MHz.
- Connect a video generator to the aerial input and select system SECAM L with 1 kHz sound and a full black picture.
- Select VDS mode and on the right-hand screen select the same programme as on the left-hand screen.
- Connect an oscilloscope to connector pin 10 of IC9R (TUN_CVBS) and trigger line frequency.
- Turn the 40.4 MHz TOKO **L9F2** fully clockwise.
- Now turn the TOKO slowly anticlockwise until:
  - ★ the amplitude of the subcarrier starts to increase or
  - ★ peaks are created on the top of the signal.

8.7 Wireless Dolby transmitter and receiver adjustment [AE]

8.7.1 *Maximum FM frequency sweep adjustment of the transmitter [AE1]*

Fine adjustment with an FM frequency sweep meter:

- Connect a signal generator to the input of the transmitter (pin 1 or 3 of plug 1409).
- Select 1 kHz 600 mV top-top signal.
- Using an FM frequency sweep meter measure the aerial output of the transmitter.
- Using **R3442** adjust so that the FM frequency sweep is 75 kHz.

Coarse adjustment without FM frequency sweep meter:

- Use the wireless Dolby transmitter and receiver.
- Select the same channel for both.
- Connect a signal generator to the input of the transmitter (pin 1 or 3 of plug 1409).
- Select a 1 kHz 600 mV top-top signal.
- Connect a multimeter to pin 2 of plug 1792 on the receiver module.
- Adjust **R3442** on the transmitter to 280 mV top-top on the receiver.

8.7.2 *FM detector adjustment of the receiver [AE3]*

Fine adjustment with a signal generator with FM frequency sweep control:

- Connect a signal generator to the input of the receiver 1710
- Select a 433.750 MHz signal with 1 mV top-top and a FM frequency sweep of 75 kHz
- Connect an oscilloscope to the anode of C2772 (T716)
- Adjust **L5710** to minimal distortion

Coarse adjustment with a pattern generator:

- Use the wireless Dolby transmitter and receiver
- Select the same channel for both.
- Connect a signal generator to the input of the transmitter (pin 1 or 3 of plug 1409).
- Select 1 kHz signal.
- Adjust **L5710** to minimal distortion.

8.7.3 *Pilot tone adjustment of the receiver [AE3]*

Fine adjustment with a signal generator:

- Connect a signal generator to the input of the receiver 1710.
- Select a 433.750 MHz signal with 1 mV top-top without FM frequency sweep.
- Connect an oscilloscope or a frequency counter to the test point T731 close to pin 13 of IC7710.
- Adjust **R3721** to 76 kHz.

Coarse adjustment with pattern generator:

- Use the wireless Dolby transmitter and receiver.
- Select the same channel for both.
- Connect a signal generator to the input of the transmitter (pin 1 or 3 of plug 1409).
- Select a 1 kHz signal.
- Adjust **R3721** to the centre of the range in which the receiver clicks on (stereo indication on pin 7 of IC7710 becomes active (low)).

8.8 VGA module adjustment [AF]

8.8.1 *Two methods:*

- With a video card for which the horizontal frequency is adjustable. Adjust **R3162** such that when the horizontal frequency is above 33.1 kHz, the SVGA detection on the OSD becomes active (32KHZ_DETECT then also becomes 'high').
- Using a signal generator (e.g. PM5326) apply a pulse with a low duty-cycle to the H(PLL) input pin 4 of IC7160 and adjust the frequency to 33.1 kHz. Adjust **R3162** such that at a horizontal frequency above 33.1 kHz, the SVGA detection on the OSD becomes active (32KHZ_DETECT then becomes 'high').

8.9 Adjustments in the Service Alignment Menu; General

Switch on by:

- briefly shorting the service pins 'SERVICE ALIGNMENT MODE' on the SSP;

or:

- pressing the <ALIGN> key on the Dealer Service Tool (DST) (RC7150), followed by keying in the password 3140 and then pressing the <OK> key.

The Service Menu will now appear on the screen.
The following information is now displayed:

1. The software date ('Date') and version ('ID.') of the ROM.
2. The accumulated total of operation hours ('Operation Hours').
3. The contents of the error buffer ('Errors') (the most recent error displayed at the upper left, immediately following 'ERRORS'; see chapter 6.3).
4. The module generating the error ('Defect. Module') (if there are multiple errors in the buffer that have not all been generated by a single module, there is probably another defect. The message 'INDETERMINATE' will then be displayed here).
5. Menu item 'Reset Error Buffer'. The error buffer can be reset by pressing the <OK> key.
   Menu item 'Functional Test'. All devices are tested via the <OK> key. Eventual errors are displayed in the error buffer (the error buffer is not erased; the contents return when the Functional Test is terminated).
7. Menu item 'Alignments'. This enables the Alignments sub-menu to be called up.
   The following alignments can be selected:

   'General':
   Adjustment of 'White Drive', 'Cut-off', 'Vg2 test Pattern', 'Peak White Limiter','PIP brightness'.

   'Normal Geometry':
   General geometry adjustments.

   'Super wide geometry':
   Geometry adjustments for the 'Panorama' position in 16:9 sets.

   'Options':
   Setting the initialisation codes in the set via text.

   'Option number':
   All options together, expressed in two long numbers. The original factory setting for these numbers can be found on the picture tube sticker on the inside of the set.

   'Store':
   Store all adjustments.

The adjustments
General:

- ★ Once all alignments/adjustments have been completed the item 'STORE' must be selected to record all the values in permanent memory.
- ★ When the option codes have been changed and stored the set has to be switched on and off using the mains switch to activate the new settings (when switching on and off via stand-by, the option code settings are NOT read by the microprocessor).
- ★ If an empty EAROM (permanent memory) is detected, all settings are set to pre-programmed standard values.
- ★ A built-in test pattern can be called up in various sub-menus. The test pattern generator can be switched on using the item 'TESTPATTERN ON/OFF'. The test pattern only appears AFTER the specific alignment/adjustment has been selected.
  The test patterns are generated by the teletext module.

8.10 Picture tube adjustments in the Service Alignment Menu

8.10.1 *'White Drive'*

- For the first adjustment turn off DNR and 'Contrast Plus'.
- Use the internal test pattern (a white picture). Adjust the white level for the three settings 'WARM', 'NORMAL' and 'COOL'.
- Start in the 'NORMAL' position and take the standard values for green, red and blue as a starting point (value 50) and then adjust red and blue.

The following default values are maintained for the 'white drive' settings:

	Cool	Normal	Warm
R	41	42	45
G	37	36	35
B	30	25	19

8.10.2 *'Cut-off'*

- Before adjusting turn off DNR and 'Contrast Plus', set brightness to step 37
  (Brightness: ██████████████ ▮▮▮▮▮▮) and the contrast setting to maximum.
- Use the internal test pattern (a black picture).

The following default values are maintained for the 'cut-off' settings:

	Cool	Normal	Warm
R	25	30	40
G	24	28	34
B	31	25	20

If the adjustment is (much) too low the set may start flashing.

8.10.3 *'Peak White Limiter'*

For all of the above mentioned picture tubes a default value of 28 can be maintained for the 'Peak White Limiter'.

8.11 Small signal adjustments in the Service Alignment Menu

PIP brightness
Adjust 'PIP brightness' in such a manner that the brightness of the PIP picture is the same as the brightness of the main picture.

8.12 Geometry adjustments 'Normal Geometry' in the Service Alignment Menu

8.12.1 *Vertical amplitude and centring*

Select 'Test Pattern on'.

a. Adjust the vertical amplitude using 'V amplitude' so that the test pattern is fully visible.
b. Adjust the vertical centring using 'V shift' so that the test pattern is located vertically in the middle.

Repeat the adjustment of 'V amplitude'.

8.12.2 *Vertical linearity*

Select 'Test pattern on'.
Adjust the vertical linearity using 'V linearity' so that the top and bottom of the picture has equal amplitude.

8.12.3 *Vertical S correction*

Select 'Test pattern on'.
Adjust the vertical S correction using 'V S-correction' so that the vertical amplitude at the top of the picture is equal to the amplitude in the middle of the picture.

8.12.4 *Horizontal centring and amplitude*

Select 'Test pattern on'.

a. Using 'H amplitude' adjust the horizontal amplitude so that the entire test pattern is visible.
b. Feed in an external test signal.
   Use 'H shift' to adjust the picture horizontally in the middle.

Repeat the 'H amplitude' adjustment if necessary.

8.12.5 *East/west adjustment*

Select 'Test pattern on'.

a. Use 'East/West parabola' to adjust the vertical lines until straight.
b. Use 'East/West corner' to adjust the vertical lines in the corners until straight.
c. Use 'East/West Trapezium' to adjust the picture until rectangular.
d. If necessary select 'East/West Top compensation' and adjust as required.

Repeat steps 8.12.5a to 8.12.5c if necessary.

8.13 Geometry adjustments 'Super wide geometry' in the Service Alignment Menu

Only applicable to 16:9 sets

8.13.1 *Vertical amplitude and centring*

Select 'Test Pattern on'.

a. Adjust the vertical amplitude using 'V amplitude' so that the entire test pattern is visible.
b. Adjust the vertical centring using 'V shift' so that the test pattern is positioned vertically in the middle.

Repeat the adjustment of 'V amplitude'.

8.13.2 *Horizontal amplitude*

Select 'Test pattern on'.
Use 'H amplitude' to adjust the horizontal amplitude so that the entire test pattern is visible.

8.13.3 *Vertical S correction*

Select 'Test pattern on'.
Adjust the S correction using 'V S-correction' so that the vertical amplitude at the top of the picture is equal to the amplitude in the middle of the picture.

8.13.4 East/west parabola

Select 'Test pattern on'.
Use 'East/West parabola' to adjust the vertical lines until they are straight.

8.13.5 Horizontal centring and amplitude

Feed in an external test signal.
Use 'H shift' to adjust the picture horizontally in the middle.

8.14 Luminance delay

A new adjustment has been introduced with the introduction of the TDA9143 (and TDA9144 in GFL). In the 'GENERAL' menu of the 'ALIGNMENTS' menu the item 'Luminance delays' has been added. These 'Luminance delays' adjustment can only be selected if the set is fitted with a TDA9143 (or TDA9144 in GFL).
If 'Luminance delays' is selected, the following sub-menu appears:

- Luminance Delay Pal
- Luminance Delay Secam
- Luminance Delay Bypass

With the 'Luminance delay' adjustments the luminance information is placed on the chrominance information (brightness is pushed onto the colour).

- The Pal adjustment is only active with Pal signals and must therefore also be adjusted with the Pal signals.
- The SECAM adjustment is only active with SECAM signals and must therefore also be adjusted with the SECAM signals.
- The BYPASS adjustment is only active with NTSC signals, whereby the COMB filter is switched on, and with Palplus signals. Therefore, this adjustment can also only be performed for these signals (if the adjustment for Palplus signals is correct, then this also is automatically good for NTSC signals with COMB filter and vice versa).

As with all other adjustments, here the modified adjustment is only stored after the 'STORE' command.

8.15 Adjustment on the PIP panel in the Service Alignment Menu

PIP AGC adjustment
The AGC adjustment prevents overdriving of the PIP-tuner if the aerial signal is too strong. Overdriving is visible as a loss of colour and synchronisation in the PIP picture. Amplification has to be adjusted to minimum level, but the PIP-picture should be as free of noise as possible.
At maximum amplification **R3912** is turned fully left, at minimum amplification **R3912** is turned fully right.

Adjustment:

- Apply a (strong) aerial signal of 4mV (72dBmV).
- Turn R3912 fully to the right (minimum amplification). Turn R3912 slowly to the left until the noise in the PIP-picture no longer decreases.
- If an aerial signal is not available, compromise by adjusting R3912 to 30% of its total travel (100% is maximum amplification, fully left).

8.16 Option menu

Introduction
The microprocessor communicates with a large number of IC's in the set. To ensure good communication and make digital diagnosis possible, the microprocessor has to know which IC's have to be addressed. The presence of specific IC's or functions is made known by means of the option codes. Only correct option code settings will ensure a correctly functioning set and signalling of the correct error message in case of a defect.
The options have been divided into different groups. These groups contain the various options for which multiple choices are usually possible.

Just as in the beginning of GFL all options which are contained in the set can be manipulated in the MD2.2 Service Alignment Mode using both the option numbers and the OPTION menu.

- All hardware related options are incorporated under the heading 'Options' of the 'Alignments' sub-menu of the 'Service Alignment Mode'.
- All software related options are incorporated under the heading 'Dealer Options' of the 'Service Alignment Mode", but can also be reached directly via the 'DEALER' knob of the DST.

8.16.1 Options in the Service Alignment Mode

Menu name	**Subjects**	**Options**	**Physically in the set**
TV Systems	IF Type	Multi West Europe Multi France Multi East Europe Multi Global BG-only	BGLM set; IF module with L5101 (without junper 4111) (diagram L) BGLL'l set; IF module with L5102 (diagram L) BGLMDK set; IF module with L5101 and jumper 4111 (diagram L) This IF-module is not planned only BG set; IF module without TS7120, 7121, 7123 and 7122 (diagram L)
Stereo Decoder	NICAM	Yes No	Audio IC7353 on Audio Module is MSP3410 (diagram O / P / P2) Audio IC7353 on Audio Module is MSP3400 (diagram O / P / P2)
PIP	PIP Available	Yes No	PIP module present (diagram S) PIP module not present (diagram S)
	PIP Tuner	Yes No	Second tuner PIP U1775 on PIP panel present (diagram S) Second tuner PIP U1775 on PIP panel not present (diagram S)
Teletext	TXT	not available 128 KB 512 KB 1 Mb	no teletext IC7490 is a 128kB (100 pages) teletext memory (code '256' in DRAM typenumber) IC7490 is a 512kB (400 pages) teletext memory (code '400' in DRAM typenumber) IC7490 is a 1MB (800 pages) teletext memory (2 code '400' DRAM's needed which is not possible in MD2.2)
	Level 2.5	Yes No	Level 2.5 TXT (only software related; in MD2.2 always level 2.5 software) Level 1.5 TXT
Communication	Easylink	Yes No	Project 50 (easylink) set No project 50 (easylink) set
Picture tube	CRT Type	4:3 16:9	4:3 picture tube 16:9 picture tube
	Picture Rotation	Yes No	Frame rotation circuitry present (IC7050 diagram G) Frame rotation circuitry not present (IC7050 diagram G)
Video Repro 1	Frame	50/60 Hz 100/120Hz Digital Scan Natural Motion	No Feature Box present Eco Feature Box present (diagram M1) Feature Box 3 present (digital scan) (diagram M1) Feature Box 4 present (digital scan and natural motion with MELZONIC IC7447) (diagram M2)
	Dynamic Contrast	Yes No	SMARTIC IC7008 on the AI module present (diagram N) SMARTIC IC7008 on the AI module not present (diagram N)
	Digital Panorama	Yes No	PANIC IC7010 on the AI module present (diagram N) PANIC IC7010 on the AI module not present (diagram N)
	Auto Format FBX (AARA)	Yes No	Only in 16:9 sets with PANIC IC7010 and SMARTIC IC7008 present on the AI module (diagram N) All other configurations
	Auto DNR	Yes No	LIMERIC IC7006 on the AI module present (diagram N) LIMERIC IC7006 on the AI module not present (diagram N)
	PALplus	Yes No	PALplus panel is present (diagram N2) PALplus panel is not present (diagram N2)
Video Repro 2	Combfilter	Yes No	Comb filter present (diagram Q) Comb filter not present (diagram Q)
	Lum. Trans. Improv.	Yes No	IC7508 TDA9177 present (diagram K) IC7508 TDA9177 not present (diagram K)
	Macrovision Prot.	Yes No	IC7352 is TDA9143 / TDA9144 (diagram K) IC7352 is TDA9141 (diagram K)
	Wide Screen Sign.	Yes No	Wide screen signalling bits for automatic 16/9 selection is enabled (only software) Wide screen signalling bits for automatic 16/9 selection is disabled (only software)
	TXT/EPG DualScreen	Yes No	IC7461, IC7462 and IC7463 present on the TXT+control module (diagram J) IC7461, IC7462 and IC7463 not present on the TXT+control module (diagram J)

Menu name	Subjects	Options	Physically in the set
	Video DualScreen	Yes No	Video DualScreen panel present (diagram AC) Video DualScreen panel not present (diagram AC)
Source Selection	SS Type	Euro MD2	Always in MD2
	Euro AV3	Yes No	3rd EURO connector present (diagram K) No 3rd EURO connector present (diagram K)
Audio Repro	Audio Repro	Basic Incr. sound Dolby + eq.	No dolby, no incredible sound, no graphic equalizer (Audio Module no dolby, no incr; diagram O) No dolby, yes incredible sound, no graphic equalizer (Audio Module no dolby with incred; diagram O) Dolby and so also graphic equalizer (Dolby Audio Module; diagram P / P2)
	Cordless Dolby	Yes No	Cordless dolby transmitter module present (diagram AE) Cordless dolby transmitter module not present (diagram AE)
	Dolby Signalling	Yes No	Automatic switching to dolby controlled by broadcaster is present (only software) Automatic switching to dolby controlled by broadcaster is not present (only software)
Miscellaneous	El. Program Guide	Yes No	IC7204 (flash memory) present on TXT+control module (diagram J) IC7204 (flash memory) not present on TXT+control module (diagram J)
	VGA	Yes No	VGA module present (diagram AF) VGA module not present (diagram AF)
	Telephone link	Yes No	Telephone interface panel present (diagram AJ) Telephone interface panel not present (diagram AJ)
	Heatsink Present	Yes No	Heatsinks present on CRT+scavem panel (diagram E) Heatsinks not present on CRT+scavem panel (diagram E)
	Philips logo	Yes No	Philips logo in Virgin mode and Demo mode (only software) No philips logo in Virgin mode and Demo mode (only software)

- If an option selection in the Service Alignment Mode is displayed in black letters, then that is the result of a different option selection in the Service Alignment Mode.
- After the option(s) have been changed, they can be stored via the STORE command.
- The new option is only active after the TV is switched off and then back on again using the mains switch (the NVM is then read out again).

8.16.2 Options in the Dealer Mode

Menu name	Subjects	Options	Physically in the set
Picture	Sharpness in menu	Yes No	Sharpness in picture menu Sharpness not in picture menu
	Tint in menu	Yes No	Tint (normal warm cool) in picture menu Tint (normal warm cool) not in picture menu
	CTI	Yes No	CTI enabled CTI disabled
	Subtitle Squeeze	Yes No	Subtitle squeeze enabled (moves subtitles upwards in case they would fall of the screen) Subtitle squeeze disabled
	Digital Options	100 Hz Digital Scan Natural Motion Nat. Motion Demo Split Screen	Only 100Hz is possible Only 100Hz and Digital scan is possible 100Hz and Digital scan and Natural motion is possible Demo mode; active areas are coloured in a black and white picture Demo mode; lower part is digital scan + natural motion / upper part is only digital scan

Menu name	Subjects	Options	Physically in the set
Personal	Blue Mute	Yes No	Blue mute active in case of no picture detected Noise in case of no picture detected
	Favourite Programmes	Yes No	Favourite program selection enabled Favourite program selection disabled
	Virgin Mode	Yes No	TV starts up once with language selection menu after mains switch on for the first time (virgin mode) TV does not start up once with language selection menu after mains switch on for the first time (virgin mode)
	Standby Toggle	Yes No	Standby toggle activated; by the standby knob the TV is switched to standby and back to normal operation again Standby toggle de-activated
	Auto Store Mode	none PDC-VPS TXT page PDC-VPS-TXT	Autostore mode disabled (not in installation menu) Autostore mode via ATS (PDC/VPS) enabled Autostore mode via ACI enabled Autostore mode via ACI or ATS enabled
	Multipip	Yes No	Multi-PIP enabled Multi-PIP disabled
	Demo Mode Enable	Yes No	Demo mode enable Demo mode disable
	Auto Format Enable	Yes No	Automatic Aspect Ratio detection (black bar detection) software is enabled Automatic Aspect Ratio detection (black bar detection) software is disabled
	Auto Sharpness Enable	Yes No	Automatic sharpness software is enabled (motion compensation depending on noise level) Automatic sharpness software is disabled
	Auto Motion Enable	Yes No	Auto motion software is enabled (smart keys coupled to nexTView) Auto motion software is disabled
	Auto Smart Control	Yes No	Auto smart control software is enabled Auto smart control software is disabled
	Menu animations	Yes No	Animations at start of menu is enabled Animations at start of menu is disabled
Teletext	Cont. Subtitles	Yes No	Continious subtitles enabled Continious subtitles disabled
	TXT Preference	top flof	Preference to top teletext Preference to flof teletext
	Infoline	Yes No	PDC infoline enabled PDC infoline disabled
	East/West Txt	East West	TXT characters for non -/58 set TXT characters for -/58 set

- If an option selection in the Dealer Mode is not displayed, then that is the result of an option selection in the Service Alignment Mode.
- After the option(s) have been changed, they must be stored via the STORE command.
- The new option is only active after the TV is switched off and then back on again using the mains switch (the NVM is then read out again).

8.17 'Option number'

In case the EAROM has to be replaced, all the options will also require resetting. To be certain that the factory settings are reproduced exactly, both option numbers have to be set. These numbers can be found on a sticker on the picture tube.

9. Ciruit description

Power supply

9.1 Audio power supply

9.1.1 Introduction

In a Dolby set with a sound power of 4 x 15W the power supply of the large signal can deliver insufficient power.

Therefore a separate power supply is selected for the sound (+16V and -16V). The so-called 'Audio power supply' is a derived version of the SOPS (Self Oscillating Power Supply) from the FL1-PTV an can supply up to 100W at maximum power.

This SOPS is a mains isolated power supply and the feedback takes place by means of an opto-coupler. Part of the +16V is branched off via potentiometer R3311.

This voltage drives the pulse width controller, which switches on TS7305 and the diode of the opto-coupler earlier or later.

This photodiode drives the phototransistor of the opto-coupler in turn, as a result of which switching transistor TS7302 is switched off earlier or later via TS7310 and TS7311.

Since this power supply is a SOPS, it has no fixed operating frequency. The nominal operating frequency is 60 Hz.

The maximum frequency (at Uin = 264V AC and min. load) is 75 kHz. The minimum frequency (at Uin = 198V AC and max. load) is 45 kHz.

The stabilization is achieved by controlling the pulse width.

In standby the power supply is adjusted back to 0V. The power supply is resistant to short-circuit and contains an over-voltage protection.

- *Switching transistor conducts, energy in the transformer*
  When the switching transistor conducts energy is stored in the transformer. The moment that the switching transistor stops conducting is determined by the pulse width controller which monitors the +16V output voltage and the +300V input voltage.
- *Switching transistor reverses, energy from the transformer to the load*
  As soon as the switching transformer reverses, the energy which is in the transformer is transferred to the load. As soon as all of the energy which was in the transformer has been siphoned to the load, the switching transistor starts to conduct again automatically via decay (see self-oscillation).

9.1.2 Pulses on transformer T5305 in normal operation (Fig. 9.1)

As long as the switching transistor is closed, energy is stored in the primary winding 5-1 and supplied to the measuring coupling 8-7:

★ As a result of the switching of switching transistor TS7302, pulses with a peak of 900V are induced on pin 5 of the primary winding. This winding is used to store energy in the transformer.

★ The positive voltage on pin 8 (+12V) is used as the measuring coupling voltage. This voltage is used to make switching transistor TS7302 conduct extra fast (due to the direction of D6307, winding 8-7 is the only winding which carries current so long as energy is stored in the transformer).

At the moment that switching transistor TS7302 is opened, the energy which is in the transformer is syphoned to the load:

- On the primary side:
  - ★ The winding 9-7 is in phase with the feeding primary winding 5-1. The positive pulse on pin 8 acts as a type of protection which ensures that the switching transistor is unable to conduct as long as there is a high) positive voltage present on pin 5.
- On the secondary side:
  - ★ The positive pulses on pin 22 are rectified and smoothed in order to create the +16V supply voltage.
  - ★ The negative pulses on pin 12 are rectified and smoothed in order to create the -16V supply voltage.
  - ★ The positive pulses on pin 20 are rectified and smoothed in order to create the power supply for the opto-coupler.
  - ★ The negative pulses on pin 14 are used to charge C2312 negatively. This negative voltage on C2312 is used to drive the pulse width controller.

9.1.3 Starting up the power supply during the first 50Hz cycle (Fig. 9.2)

When the first positive half power supply pulse (50 Hz) 'arrives' then via the starting circuit (R3301, R3302, R3306 and L5302) a positive voltage arrives on the base of switching transistor TS7302. As a result of this TS7302 starts to conduct and causes a linear increasing current through primary winding 5-1 of the transformer. This causes the voltage on pin 5 of the transformer to drop and the voltage over the primary winding 5-1 to increase.

Because the voltage over winding 5-1 increases, the voltage over the measuring coupling winding 8-7 also increases causing the voltage on pin 8 to also increase (pin 7 is kept at a constant -5V; see -5V generation). As a result of this an additional starting current is fed back, from pin 8 via C2304 and R3329, with the starting current through R3301 (avalanche effect). This additional starting current runs via 2 routes:

- For rapid changes - in other words during start up - C2304 forms a short-circuit. Therefore the current path C2304, R3329 provides a *short, strong* additional current pulse.
- At the same time a linear increasing positive feedback current flows through D6307 as a consequence of L5303. As a result of this, switching transistor TS7302 conducts more and the voltage on pin 5 drops even faster until the switching transistor is saturated. This current path therefore *maintains* the additional current pulse up to the first self-oscillation (see the description for self-oscillation).

In the event of any breakdown of TS7302 between C and B, the base voltage is limited to 1V8 by means of D6324, D6325 and D6336. As a result of this the transistors on the primary side of the control loop (TS7304, TS7310, TS7311 and TS7315) are protected.

9.1.4 Through-starting via self-oscillation (from the 2^{nd} 50Hz cycle up to take over by the control loop) (Fig. 9.2)

Self-oscillation takes place as long as the secondary voltages are still not too low in order to allow the control circuit to work (so that it can still not be adjusted back).

- Immediately after starting up a linear increasing current flows through primary winding 5-1 which can never be higher than hfe x Ib.
- At the moment that this point is reached the primary winding 5-1 will hold its voltage as a result of which the impedance of the primary coil will start to drop. As a result of this the voltage over primary winding 5-1 and over the positive feedback winding 8-7 drops. The positive feedback current, the base and, as a result of this, the collector current of switching transistor TS7302 also drop, resulting in this starting to reverse.
  As a result of this pin 8 of the positive feedback winding becomes negative. The base voltage of TS7302 drops, the collector voltage increases, the positive feedback winding and the base voltage become more negative as a result of which TS7302 reverses more quickly (once again an avalanche effect, but now in reverse).
- Now that TS7302 is reversed, all energy which was stored in the transformer is supplied to the load.
  Because the secondary flows want to and can continue to flow (secondary diodes are conducting), the voltages reverse over the secondary windings and as a result of this the voltages over the primary windings also reverse.
  As a result of this the capacity on pin 5 of the transformer can charge up C2305 to the peak value of 900V (300V + (Vsec x n)).
- At the moment that all energy has been transferred from the transformer to the load, a resonance takes place between the primary winding 5-1 and C2305.
- If, during the resonance, the voltage over the primary winding 5-1 becomes positive, the voltage on the positive feedback winding 8-7 will also become positive. As a result of this the switching transistor will again start to conduct. This results in the voltage on the positive feedback winding 8-7 becoming high and the switching transistor again starts to conduct.
- This process repeats itself as a result of which the secondary voltages are built up more and more until the control loop, which provides the stabilization of the SOPS, comes into operation (see pulse width controller).

N.B.:

- Self-oscillation can also take place if the control circuit is faulty.
- Disconnecting pin 5 of the opto-coupler IC7301 and then carefully increasing the mains voltage using the VARIAC can be handy for fault tracing. As a result of this the SOPS is forced to continue running in self-oscillating mode.

9.1.5 Building up and maintaining the -5V on pin 7 of the transformer (continuous process) (Fig. 9.2)

In order to be able to quickly switch off switching transistor TS7302 and thus avoid its dissipation, -5V is applied to the base of TS7302 when switching off. The stabilization of pin 7 of the transformer is explained here.

- When switching transistor TS7302 is conducting, pin 8 of the transformer has +12V. Because *68328 and D6327 now* start to conduct, energy can be passed on from the source to the load. The output voltage over R3305 is stabilized exactly at -5V by the Zener -(5V6-0V6) via the 5V6 Zener and D6328 and the 0V6 of the BE of TS7300. R3343 and R3337 limit the current through transistor TS7300.
- During the reversal of switching transistor TS7302 the voltage on pin 8 of the transformer drops to -36V. D6327 and D6326 reverse and energy is no longer delivered to the load.

9.1.6 Stopping switching transistor TS7302 from conducting (Fig. 9.3)

The amount of energy which has to be pumped into the transformer has to be determined by the amount of energy which the load requires. In order to control this the pulse width controller on the secondary side makes the photo-diode in the opto-coupler conduct at just the right moment, as a result of which the switching transistor is ultimately reversed.

This works as follows:

If the photo-diode on the secondary side starts to conduct, the photo-transistor on the primary side of the opto-coupler also conducts. As a result of this TS7310 starts to conduct, causing TS7311 to conduct. As a result of this the base of switching transistor TS7302 becomes connected to -5V via L5302 and R3306. A short and simultaneously very strong negative base current then flows as a result of which TS7302 reverses quickly and dissipates as little as possible. The quick 'drawing empty' of a transistor with a negative base current is called 'hollowing'.

During the reversal of switching transformer TS7302 there is a positive pulse on pin 5 and, due to this, also on pin 9 of the transformer. During this positive pulse TS7304 conducts as a result of which it is ensured that TS7310 and thus TS7311 also remain conducting. As a result of this TS7302 definitely remains in reverse when the high voltage is present on its collector.

Diodes D6305 and D6333 serve to protect transistors TS7304 and the opto-coupler.

9.1.7 Pulse width controller (Fig. 9.3)

Switching transistor reversed, energy to the load

As long as switching transistor TS7302 is reversed there is a negative pulse on pin 12 and pin 14 of the transformer.

The negative pulse on pin 14 charges C2312 negatively via D6315 and R3317 *(negative charging current I_A)*. As a result of this TS7305 reverses and no current flows through the diode of the opto-coupler. The secondary windings now deliver energy to the load.

Switching transistor conducts, energy in the transformer

As soon as all energy has been passed from the transformer to the load (secondary flow then becomes zero) the polarity of the voltages on the transformer reverses (see self-oscillation). Switching transistor TS7302 now starts to conduct and on pins 12 and 14 of the transformer there is now a positive voltage and on pin 22 a constant negative voltage.

Two current routes are created:

- **Because** pin 12 of the transformer is positive, D6313 and D6314 conduct and C2312 is charged up positively from its negative voltage (*positive charging current I_B*).
- The +16V output voltage is measured directly via TS7303. Because the voltage on pin 22 is now negative D6318 does not conduct as a result of which the base of TS7303 forms a direct reflection of the +16V output voltage via R3310, R3311 and R3312. For example, with an increase of the +16V the base will increase less than the emitter of TS7303, as a result of which TS7303 conducts more and thus generates a larger current (*positive charging current I_C*). Therefore, using R3311 the output voltage can be adjusted to +16V (so long as the switching transistor TS7302 reverses, pin 22 of the transformer is positive, D6318 conducts and the base of TS7303 lifts. Therefore this control only works as long as switching transistor TS7303 is conducting).

These two positive charging currents charge C2312 positively. As soon as the voltage on the base of TS7305 becomes higher than 1V2 TS7305, starts to conduct. The diodes and, due to these, the photo-transistor of the opto-coupler, conduct, as a result of which switching transistor TS7302 starts to reverse.

Load increase
With increasing load, the +17V and the -17V drop:

- Because the +17V wants to drop the base of TS7303 will want to drop by approximately half with regard to the drop of the emitter of TS7303. As a result of this TS7303 is driven less open, resulting in the *positive charging current I_C* decreasing.
- Because the negative pulse of pin 14 decreases when the output voltages are dropping, the *negative charging current I_A* will also decrease. However, due to the TS7303 control the power supply is correct immediately, as a result of which more energy is pumped into the transformer. As a result of this pin 14 again becomes more negative, causing the *negative charging current I_A* to increase again.
- The *positive charging current I_B* will remain constant because that is only related to the level of the primary voltage 300V (see mains voltage variations).

Due to the increased negative charging current I_A, C2312 becomes charged up more negatively and due to the decreased positive charging current I_C, C2312 will be charged up less quickly. Due to these two mechanisms it takes longer before C2312 reaches the 1V2, as a result of which TS7305 is switched later. As a result of this the switching transistor is switched off later and more energy is pumped into the transformer. As a result of this the load increase is compensated.

Mains voltage variations
When the mains voltage becomes lower, the positive voltage on pin 12 also becomes lower (thus lower than 10V). As a result of this the positive charging current I_B becomes smaller, as a result of which it takes longer before C2312 reaches the 1V2.

When the mains voltage becomes higher, the positive voltage on pin 12 becomes higher as a result of which C2312 charges up more quickly. As a result of this the duty-cycle reduces (T-on becomes shorter if T-off remains the same). In order to limit this duty-cycle when the mains voltage becomes too high the current path I_B receives and additional current path via Zener diode D6321 when the input voltage is too high. In this way there is an additional charge on C2312, as a result of which this charges up more quickly and the switching transistor switches off more quickly. The maximum duty-cycle is limited in this way so that the maximum power in the event of over-voltage can not then become greater than for nominal voltage.

	TS7302 conducts, therefore energy into the transformer	TS7302 reverses, thus energy to the load	
C2312	positive charging current	negative charging current	
I_A as a result of U_{sec}	0	present	U_{sec} I_A C2312 charged up less negatively
I_B as a result of U_{prim}	present	0	U_{prim} , I_B , C2312 charged up positively more quickly
I_C as a result of U_{sec}	present	0	U_{sec} I_C C2312 charged up positively less quickly

9.1.8 *Standby (Fig. 9.3)*

If the set is switched to standby the 'St-By-INFO' is set low by the standby-µP (active low). As a result of this TS7312 reverses in standby, as a result of which TS7306 conducts via the +5STANDBY supply voltage, R3341 and D6317. Therefore, the diode of the opto-coupler conducts continuously in standby and the 'Audio power Supply' is completely adjusted back to 0V output voltage. In standby the photo-diode continues to be supplied by the +5STANDBY via D6316.

9.1.9 *Protections (Fig. 9.3)*

When a fault is detected on the 4 x 15W sound power amplifier panel, for example because the +16V or the -16V is too low or too high), this panel makes the 'DC PROT' line high (+5V). As a result of this TS7306 will conduct and adjust the power supply completely back (same principle as in standby).
D6316 ensures at the same time that switching transistor TS7302 does not become faulty if the positive voltage is not present on pin 12. The photo-diode is then supplied with the +5STANDBY.
As long as the +17V is greater than 19V4 then, via D6311, R3318, D6331 and D6308, translstor TS7306 will conduct and the power supply will be adjusted back to 0V.

9.2 Changes to the power supply section of the large signal panel

9.2.1 *Semi-standby mode*

For the main supply on the large signal panel it is the intention that in certain conditions the set can be placed in the semi-standby mode, for example as in EPG mode. This means that the power supply works completely but that the series switch is switched off so that the line stage does not operate. The switching on or off of the series switch takes place from the SSP panel via the 'SLOW DOWN' line. This semi-standby principle existed already in MD2.1 (i.e. when starting up the set the series switch must initially be open), but for MD2.2 there are a number of changes which have been made in the power supply section.

9.2.2 *Degaussing circuit (only for EPG)*

Principle
When changing over from standby to semi-standby in the EPG mode then the degaussing will not work correctly because people can be frightened by unexpected degaussing. To avoid this the degaussing may only take place if the mains voltage is switched off completely and then back on again. For this purpose the control of TS7507 is adapted for sets with EPG.

Operation
When switching on the degaussing switch, TS7505 is triggered via winding 5-6 of the transformer L5550 and TS7515 so that the degaussing can start. C2514 changes up via R3532. When, after this, C2514 is sufficiently charged up (this is determined by D6514), TS7513 and, as a result of this TS7514, will start to conduct. Once TS7514 is fully conducting, TS7512 will continue to conduct and, as a result of this, TS7514 will again continue to conduct (TS7512 and TS7514 together form a thyristor function) until the mains voltage is completely switched off.
Because TS7512 now remains conducting, the base of TS7515 remains high so that this continues to be reversed, with the result that TS7507 remains switched off until the mains voltage is completely switched off.
The number of windings on the transformer is increased so that even in standby the 'thyristor' TS7512-TS7514 remains operational. As a result of this, switching the degaussing back on is only possible after C2514 is sufficiently charged up, in other words after switching off the set.

9.2.3 *Changes to the primary side for reduced standby power (only for MC44604) (Fig. 9.4)*

Introduction
In order to reduce the dissipated power in standby (without degaussing) (< 2W) a new control IC has been selected, namely the MC44604 instead of the MC44603 (the power supply with the MC44603 consumed 3.75W in standby). This new IC has an integrated 'optimalized standby function'.

Higher burst frequency (the number of burst periods per unit of time)
In order to reduce the dissipated standby power the under-voltage level of IC7520 is increased only in the standby mode, as a result of which the burst frequency (the number of burst periods per unit of time) is increased. This is done as follows:
In standby the Vcc of IC7520 increases via R3528 to the level Vth. As soon as Vth is reached the IC starts operating and generates control pulses. The power supply will now start up. Because the start-up circuit is unable to deliver sufficient current, the Vcc is normally taken over by the take-over winding 9-8 of the transformer. However, in standby mode the power supply is adjusted back so much that the take over is insufficient and the Vcc sinks immediately. As soon as the Vcc arrives below the under-voltage level the IC, and thus the power supply, will be switched off again and the Vcc will increase via R3528. Because with the MC44604 the under-voltage level is increased only in the standby mode, the number of burst periods is increased per unit of time. The frequency at which the power supply tries to start up during the burst is the same as that of the MC44603 and the same as that in normal operation (the power supply is an FFS (Fixed frequency Supply), in other words it also runs at approximately 40 kHz in standby mode).

Other changes to the primary side for reduced standby power for the MC44604

- R3528 is increased for the MC44604 as a result of which the dissipation in this resistor is smaller. In order to ensure that the start-up time is the same as before the C2525 is smaller for the MC44604.
- Because the C2533 (voltage on pin 11 determines the duty-cycle) is smaller for the MC44604, the duty-cycle is built up more quickly as a result of which the slow-start runs more quickly. As a result of this the burst period (the time that the power supply tries to start up in standby) is shorter, as a result of which the power supply itself works more efficiently (less dissipation losses in the power supply itself).

9.2.4 *Changes to the secondary side for the reduced standby power (only for MC44604) (Fig. 9.5)*

Place MC44604 in standby mode
The MC44604 must receive a sign in order to enter the standby mode with reduced burst frequency. Pin 15 of IC7520 is used for this. As soon as the input current on pin 15 is greater than 35 mA then IC activates its standby mode.
In order to create this current surge a change has been made to the secondary side of the main power supply. When the STANDBY signal is low (active), TS7589 will reverse as a result of which the full +5STANDBY power supply suddenly arrives on the positive side of C2590. C2590 is unable to follow this rapid change and drives TS7588 into full conductance as a result of which a large, brief current starts to flow through the photo-diode of TS7556 (opto-coupler). As a result of this a brief, strong current peak which flows to pin 15 of IC 7520, is generated on the primary side and the MC44604 activates its standby mode.

Maintaining power supply in standby mode for a power supply with the MC44604
Because C2590 charges itself up as soon as the standby mode is activated, at a given moment TS7588 will start to reverse. Because TS7591 only conducts continuously in standby mode (only in the standby mode is the +5STANDBY power supply on the base of TS7591 via R3586 and R3598), a current can only still flow through the diode of the opto-coupler via D6592 and TS7591 to earth. This current is large enough to maintain the standby state. Because TS7591 also conducts during the 'burst' (the time that the power supply tries to start up in standby) the power supply is adjusted back even harder during the 'burst'. As a result of this the 'burst' will not last as long.

Stable +5STANDBY with the MC44604
In order to prevent that the +5STANDBY becomes too low in standby mode as soon as the input voltage of the voltage stabilizer IC7560 is at the lowest point (as a result of which even a POR could be generated), a few changes have been implemented for the power supply with the MC44604:

- Due to the higher burst frequency the ripple on the 5STANDBY is smaller. As a result of this the smoothing capacitor C2571 can be smaller.
- D6561 has been replaced by a type with a low forward voltage (0V2), as a result of which less voltage loss occurs.
- The transformer has been examined again in order to obtain improved efficiency in standby mode.

In this way it is ensured that the input voltage of the voltage stabilizer IC7560 is always large enough to create the +5STANDBY.

Changes for normal operation with the MC44604

- D6550 is added to protect the power supply if the +5STANDBY fails. If the +5STANDBY fails, the STAND-BY signal drops out as a result of which TS7592 starts to reverse. As a result of this thyristor TH7590 starts to conduct as a result of which the voltage over C2561 and C2571 will become too high. Zener D6550 has been added in order to protect these capacitors. At the same time this Zener ensures that the power supply is adjusted back to its maximum. The power supply will start up again, be adjusted by the maximum again, etc.→ hick-up mode.
- Because more energy is demanded from the +8V6 power supply in the MD2.2, the +8V6 voltage stabilizer IC7569 is a type which only requires low over-voltage in order to be able to generate a stable +8V6 (a so-called 'low drop' type).

9.2.5 *Primary over-voltage for the MC44604 (Fig. 9.4)*

Over-voltage detection for the MC44604
For the MC44603, over-voltage detection takes place via the Vcc input of the IC. In the MD2.2 for an MC44604 the separate OVP input is used on pin 6 of the IC. Since the Vcc depends too much on the mains voltage (+300V DC) and the load, it is possible that at high load large peaks arrive on Vcc as a result of which the OVP is triggered. Therefore, the voltage on winding 9-8 of the transformer is detected via a clamp circuit and a divider (D6548, R3548 and R3549). Only if pin 6 becomes higher than 2V5 will the power supply go into protection (hick-up mode).

Operation at increased input voltage (+300V DC)
In order to obtain a more constant output power as a function of the mains voltage, R3529 is added between the +330V DC and the current sense pin 7 of the IC. This sets a DC component which is dependent on the level of the +300V DC on the current sense input at the top of the current sense voltage, such as that which is measured on the source of the TS7541 FET-link. As soon as the +300V DC increases the complete current sense signal is raised a little on pin 7 as a result of which the T-on decreases by a constant value.

Video processing

9.3 PALplus (fig. 9.6)

9.3.1 *Introduction*

With 16/9 sets, the PALplus module takes care of both the vertical conversion and also the improved separation between luminance and chrominance.
The module receives the 8 bit Y, 2 bit U and 2 bit V signals from the A/D convertor in the Feature Box. After the PALplus decoding, the signals again go via the AI panel to the Feature Box, where the 50 Hz picture is converted to 100 Hz. Control is provided by the *snertbus* of the processor on the Feature Box. The PALplus module, the AI PCB and the Feature Box are connected by a series of timing signals.

9.3.2 *General operation*

The MACPACIC (Motion Adaption Colour Plus And Control IC) is controlled by the *snertbus*. The most important
function of this IC is to take care of the separation between luminance and chrominance if MACP is used in the transmitter. The MACPACIC uses both the direct Y, U and V and also those stored in MEM1.
MEM4 is an extra working memory.
The processed picture information is written to memories MEM2 and MEM3.
The VERIC (Vertical Reconstruction IC) reads Y, U and V from memories MEM2 and MEM3 and once again makes a picture of 574 lines from the 430 picture lines by means of the 144 helper lines. This IC is monitored by the MACPACIC which generates a number of clock and sync signals for this.
The module input and output are 16 MHz. The module operates at 32 MHz.

9.3.3 *Motion Adapter Colour Plus*

The MACPACIC sees to separation of chrominance and luminance if MACP (Motion Adaption Colour Plus) is used in the transmitter. Because of this, the picture is free from chrominance and luminance crosstalk.
The first raster is written to memory MEM1. When the second raster is presented directly to the MACPACIC, MEM1 will be read out causing both rasters to be present at the same time at the MACPACIC input.
MACP can be used independently of the picture mode, i.e. also with 4/3 transmissions.

9.3.3.1 *Film mode*
In the film mode, 50 rasters are made of the 25 pictures in the transmitter. There is no time difference between the successive even and odd rasters. Because of this,
the picture information of line N in the even raster will be nearly identical to that of line N in the following odd raster.
The chrominance of line N in the first raster is in phase opposition to the chrominance of line N+312 in the second raster. In the receiver, addition of the even and odd rasters will thus produce a Y signal which is free from chrominance. Because of this, no further suppressions of the chrominance
at 4.43 MHz are required in the Y channel.
After the PAL demodulator, frequencies around the 4.43 MHz in the Y signal give a U and V component which is in phase opposition for the lines N and N+312. Addition of two successive rasters in the U and in the V channels will eliminate this colour component.
These operations are termed FCP (Fixed Colour Plus), which produces the same result as a comb filter.

9.3.3.2 *Camera mode*
In the camera mode, unlike the film mode, there is a time difference between the successive even and odd rasters. This time difference causes differences in the successive rasters, especially in content, with fast-moving pictures. The aim will always be to switch over to FCP as far as possible since this gives the best picture quality. This is only possible however if there is almost no difference in picture information with the successive rasters.
Accordingly a movement detector is built into the decoder and this determines for each small part of the picture whether any movement is present. Memory MEM4 is used for this.
With pictures where there is little movement, indicated by the movement detector, switchover to FCP occurs.
With fast-moving pictures the bandwidth of the Y signal is limited to 3 MHz, because of which the chrominance is removed at 4.43 MHz. The resulting Y, U and V are written by the MACPACIC to memories MEM2 and MEM3.

9.3.4 *Vertical conversion*

To reproduce a 16/9 picture in a 4/3 format the 574 picture lines are converted to 430 lines in the transmitter. Because of this, picture information is lost, and without correction this leads to reduction in the vertical resolution.
To be able to make good this loss in vertical resolution, the 'lost' Y information is AM modulated on a 4.43 MHz carrier wave with the same phase as the U signal and is processed in the black bars above and below the picture.
The 72 lines in the black bar above the picture contain the 'lost' information of the upper half of the picture. The 'lost' information from the lower half of the picture is to be found in the 72 lines in the black bar below the picture. These lines with modulated 'lost' information are also termed 'helper lines'.
The VERIC will once again make a picture of 574 lines from the 430 picture lines.
A 'reconstruction' takes place for the Y signal, in which use is made of the 144 helper lines. Since no helper signal is present for U and V, these are determined by 'interpolation'. When the upper half of the picture is processed, the helper lines are routed to MEM2 and the picture to MEM3. For the processing of the lower half of the picture, the picture goes to MEM2 and the helper lines to MEM3.
Writing to these memories is done by the MACPACIC, readout being carried out by the VERIC.
In film mode, a complete picture is present after two rasters and because of this the conversion will take place for each picture.
In camera mode because of the time difference between two successive rasters there is a difference in picture content because of which conversion must be carried out for each raster. The helper lines are then composed differently and the use of the memory will therefore also be different.

9.3.5 *Transparent mode*

With a non-PALplus transmission, luminance and chrominance are switched through in the MACPACIC.
The top and bottom picture halves are routed respectively into memories 2 and 3. The VERIC then sees to it that the information for the even and odd raster is read in the correct way.

9.3.6 *Detection*

To be able to recognise when this extra PALplus information is present in the video signal and to be able to detect and demodulate this correctly, some extra information is also added.

Line 23 therefore contains no picture information but does contain some signalling bits such as:

- camera or film mode
- MACP used
- helper lines present.

These bits are detected by the MACPACIC.
This line also contains a reference burst with the correct amplitude, DC and phase for the helper lines.
Line 623 contains the reference level for white and black.

9.3.7 *Remarks*

With a PALplus set, the chrominance IC TDA9144 is used instead of TDA9141 or TDA9143.
The helper lines with Y information modulated at 4.43 MHz, are demodulated in the PAL demodulator and multiplexed in the Y signal. Since information which comes out below the back level is present here, the blanking in the IC has been adjusted.
The chrominance IC TDA9144 generates line 22 which contains the references for the black level and the DC level of the helper lines. Some filters in the IC, both in the luminance and in the chrominance channel, are if necessary switched off with PALplus.
There is no PALplus recognition within the TDA 9144.
This means that all PALplus functions from the microprocessor must be indicated via I²C.
The microprocessor in turn receives PALplus recognition information from the PALplus module.
The MACPACIC generates the 16 MHz and the 32 MHz clocks. The phase between these two clock signals is adjusted by S5100.
All processing operations in the PALplus module are digital.

9.4 CRT & Scavem

9.4.1 *Power limiting of the RGB amplifiers*

9.4.1.1 *Introduction*
The RGB output amplifiers are identical to those used in the MD 2.1, though in the lowest segment of the MD2 2, the RGB output stages are no longer fitted with heat sinks. To ensure that the dissipated power, which is produced chiefly at high frequencies, remains within the limits of these output stages, an extra circuit is added. In case of consumption greater than 3.6 W (measured via R3373), this circuit will reduce the definition of the picture. This causes the current consumption of the output stages to fall. In practice, this power reduction circuit will only be activated in case of a picture with a great deal of noise.

9.4.1.2 *Circuit*
The power consumed by the output ICs is detected across resistor R3373; this is fed to TS7374. This is an amplifier with an amplification factor of -1.
The collector voltage of TS7374 is thus equal to the voltage measured across R3373.
If the collector voltage of TS7374 rises, then TS7377 will conduct more and the collector voltage of TS7377 falls.
In case of current consumption higher than 18 mA (3.6 W), the collector voltage of TS7374 becomes greater than 6 V, the collector voltage of TS7377 becomes lower than 11.4 V and because of this, TS7338, TS7348 and TS7358 start to conduct.
When these transistors conduct, a capacitance is placed in parallel with the input signal, causing the picture definition to be reduced and the current consumption, and thus the dissipation too, to fall once again.

9.4.2 *Improved SCAVEM*

To improve Scavem operation, a larger current of about 1 A pp is sent through the Scavem coil. To achieve this, the amplification of the output stage is adjusted (R3408 200 ohms instead of 100 ohms) and the output transistors TS7414 and TS7415 are changed to power transistors (BD139, BD140).

9.5 Luminance Transient Processor (LTP) (fig. 9.7)

9.5.1 *Introduction*

In the MD2.2, the LTP IC TDA9177 may optionally be added in front of the video control IC TDA4780. This IC is I^{2}C controlled and carries out some corrections to the Y signal. These are:
- smart peaking
- step improvement
- noise suppression

9.5.2 *Functional description*

9.5.2.1 *The input signals*

The input signals are formed by YUV on pins 5, 9, 7 and a sandcastle on pin 1. The output signals are YUV on pins 20, 16 and 18. The U and V signals are delayed according to the corrections to the Y signal.

9.5.2.2 *Smart peaking*

Smart peaking is a circuit which only applies peaking to small signal changes; because of this, details in the picture can be seen more clearly. The extent of peaking and the signal amplitude to which smart peaking operates, can be adjusted via I^{2}C. With large signal amplitudes (e.g. with black-white transitions) there will be less peaking to avoid unwanted shadow effects. When the LTP is used, the software peaking of the Feature Box will be turned off but the hardware amplification continues to operate.

9.5.2.3 *Step improvement*

This provision ensures than black-white transitions are made even steeper. The result of this is that the picture gives a still sharper impression.

9.5.2.4 *Noise suppression*

The LIMERIC in the Feature Box determines the noise level in the picture and appraises this by means of the noise figure which is passed on via I^{2}C to the microprocessor. On the basis of the noise figure, in addition to the degree of noise suppression in the LIMERIC and the degree of DNR, the degree of peaking together with the 'steepness' and the 'coring' in the LTP is now also reduced in proportion with the rise in the noise figure. Because of this, even better noise suppression can be arranged.

9.6 Chrominance notch filter

As well as a chrominance-free Y signal, the COMB filter also produces a few unwanted residues in the vicinity of 4.43 MHz. These residues can be clearly seen when there are sharp colour transitions. To suppress this interference, a filter is fitted between the Y output of the COMB filter and the input of the chrominance IC (IC 7352). This filter is switched on together with the COMB filter. As soon as the COMB filter is switched on (COMB ON/OFF is high), TS7396 will then conduct and the LC circuit (C2351, C2352 and L5382) is switched on. This LC circuit gives an extra 6 dB of suppression at 4.43 MHz.

9.7 Transparent OSDs and menus (fig. 9.8)

9.7.1 *Introduction*

In the first instance, the operating menus of GFL and MD2.1 consisted of a menu block with a background colour and printed on it the menu text in a foreground colour. With the menus of the MD2.2, the menu block with background colour is replaced by a block in which the main picture is displayed attenuated and the menu text is shown in white on it. With the so-called 'Blending' circuit it is possible to display these so-called 'transparent operating menus' on the screen.
To produce these menus, a number of control signals are required, such as the RGB signals and the Fast Blanking. These four signals were hitherto sufficient to be able to display a menu. However, for the transparent operating menus an extra timing signal is required, namely the COR-NOT signal. The signals are now used as follows:
- At the time that the 'menu block' is written, the TXT-IC produces a low on the COR-NOT line. At that time the blending circuit will ensure that if a specified beam current is exceeded, the contrast is reduced via the beam current limitation in the video controller TDA4780. By only reducing the contrast with effect from a specified beam current, darker picture sequences are displayed unaffected so as to prevent these disappearing completely below the black level.
- However, when text is to be displayed in a menu block, the Fast Blanking information is used to switch off the blending circuit again. Because of this, the contrast is not reduced only where the text is shown in white.

9.7.2 *Blending circuit*

The blending circuit is located on the TXT+control panel.
If we assume in the first instance that there is no menu (COR-NOT line is high), then TS7453 conducts and TS7454 is in the blocking state. Because of this, TS7455 conducts in such a way that TS7457 blocks sufficiently to ensure that the V_{OUT} can follow the V_{BCI} via the BE of TS7459 and the BE of TS7458. At the time the menu appears, the COR-NOT line will become low and TS7454 will conduct. The resistor division R3445 and R3443 now sees to it that the base of TS7455 is set to 2V8.
- As long as V_{BCI} < 2V8, V_{OUT} follows the V_{BCI} via the BE of TS7459 and the BE of TS7458. This applies to the darker picture sequences and so these are not attenuated.
- If a voltage increase to above 2.8 V occurs, the base of TS7455 will only partially rise (due to the voltage division R3443, R3444, R3445). This only partial voltage rise is passed through the BE of TS7455 and the BE of TS7457 to the V_{OUT}. Because of this, the V_{OUT} will rise less strongly only if the V_{BCI} is greater than 2V8 (lighter picture sequences). This results in a reduction in contrast.

In other words, the DC setting of the base of TS7457 governs the changeover point of the contrast reduction (and thus the brightness at which the contrast reduction must begin with transparent menus).

9.7.3 *PIP in front of TXT in a set with blending circuit*

In a set without transparent OSDs and menus (MD2.1), it is desirable to have the PIP card always in the foreground (and thus in front of the menus, in front of the OSDs and in front of the TXT). This is done in MD2.1 via the TXT-KILL line and TS7518 (in PIP-mode TXT-KILL is high causing the FBL-TXT to be short-circuited (deactivated) via TS7518).
In a set with transparent OSDs and menus (MD2.2), the PIP card is placed in the background so that the PIP card is viewed through the transparent OSDs and manus. Only in the TXT mode is it desirable to have the PIP card in the foreground. For this the circuit round TS7221 has been added to the FBL-TXT line on the TXT+control panel. C2220 is chosen so that TS7221 passes the FBL-TXT signal to the TXT-ENABLE only in the TXT mode and not in any other modes.
- Only in the TXT mode is the FBL-TXT line constantly high so that C2220 is charged and TS7221 conducts constantly. The FBL-TXT is passed to the TXT-ENABLE and therefore with PIP the FBL-TXT is short-circuited via the TXT-KILL (PIP in front of TXT).
- In all other modes (e.g. OSDs, menus and TXT-mixed mode), FBL-TXT is not constantly high. Because of this, C2220 is not sufficiently charged so that TS7221 is constantly in the blocking state. Because of this, the FBL-TXT is not passed to the TXT-ENABLE so that with PIP, the FBL-TXT cannot be short-circuited via the TEXT-KILL (PIP behind OSDs, menus, mixed mode).

9.8 Automatic Aspect Ratio Adaption (AARA)

9.8.1 *Introduction*

With certain wide picture transmissions, the WSS bit (Wide Screen Signalling bit) is not included with the transmission. This applies to transmissions in 22/9, 16/9 or 14/9 format.
The customer on the reception side is then faced with a picture where the format is not correctly adjusted (black bars). This can then only be corrected by operating the picture format button on the remote control.
AARA now provides automatic adjustment of the picture format.

9.8.2 *Operation*

The software in the Feature Box contains a 'black bar detection algorithm'. This black bar detection looks to see whether black bars are present at the top or bottom of the picture. This is done by means of the SMARTIC.
If these bars are present for more than 22 seconds then the picture format is corrected to a maximum of 22/9. The picture width is adjusted by the PANIC and the picture height by the PROZONIC/MELZONIC.
Black bar detection operates independently of the operating software of the set.
Black bar detection can be overruled by:
- the WSS bit
- by an external 16/9 status on a scart input
- by adjusting the picture proportions manually

This function is implemented independently by the software in the Feature Box.

Audio processing

9.9 Audio amplifier

9.9.1 *Introduction*

For the MD2.1 sets we had different versions:
- Non Dolby fighter version
- Non Dolby horn version
- Non Dolby subwoofer version
- Dolby subwoofer version

In order to be able to delivery more audio power, for the most expanded MD2.2 a choice can be made for a separate audio amplifier, the so-called Audio Amplifier module. For this the audio power supply has to be stronger, as a result of which a stronger power supply unit - the so-called 'Audio Power Supply' - is used. As a result of this we have one additional version in the top MD2.2 sets:
- Top Dolby subwoofer version 4 x 15W.

9.9.2 *Block diagram of the Dolby subwoofer version (Fig. 9.6)*

The audio signals Surround, Left, Right and Centre originate from the Dolby Audio Module. The power of the output amplifier is 15W per channel.
On the LSP the output amplifier in a Top Dolby subwoofer version is only used for amplifying the surround-sound signal. This has the advantage that a separate channel is provided for both L and the R surround. Because the output signal from the amplifiers is at a DC level of +14V, the outputs are AC coupled to the surround loudspeakers.
On the Audio Amplifier Panel the amplifiers are localized for the Left, Right, Centre and Subwoofer signal.
- The signal which is intended for the subwoofer is a mono signal (L and R are added), because the low frequencies are not direction sensitive. The higher frequencies are filtered out from 270 Hz. The DBE circuit which was previously on the LSP, has now been mounted on the Audio Amplifier Panel. This DBE (Dynamic Bass Enhancement) circuit provides an improvement in the low tone reproduction which is supplied to the subwoofer. The lower half of IC7740 is used for amplifying the subwoofer signal.
- The L and R signals are amplified in the 2 upper halves of amplifiers IC7740 and IC7750. The L and R signals both run via a 200 Hz filter to the internal squeeters which provide the stereo effect, or directly to the internal loudspeakers. In the latter case the input of the subwoofer amplifier is also connected to earth.
- The Centre signal runs via a high-pass filter at 310 Hz and the lower half of amplifier IC7750 to the centre speakers at the bottom centre of the set.

The internal or external selection is determined by a switch on the Clickfit Panel.

9 9 3 *Internal/external selection (Fig 9.10)*

The selection is made using a switch on the Clickfit Panel which sends either +6V or earth to pins 9, 10 and 11 of IC7735.

For the internal mode pins 9 to 11 (inclusive) are set low.

As a result of this all switches are in the lowest position.

For the L and R signal which is intended for the squeeters, all frequencies lower than 270 Hz are filtered out first.

Before these signals arrive on the output amplifiers they are initially attenuated by R3700, R3701, R3702 and R3703.

The power supply for these output amplifiers is symmetric (+16V and -16V), as a result of which all outputs can be coupled directly to the loudspeakers. The amplification is determined internally in the output amplifiers by means of 2 internal resistors between the input and the output.

The Boucherot filter consists of C2746, C2776 and R3746 and serves to filter out oscillations at high frequencies.

All amplifiers are almost identical, only the values of the Boucherot filter can vary depending on the type of loudspeaker which is used.

The subwoofer signal is a mono signal and runs via the DBE circuit to the respective output amplifier in the internal position.

In the internal position the subwoofer signal from the output amplifier is connected to earth, as a result of which the subwoofer is switched off. The L and the R signal is sent directly to the output amplifiers.

The centre channel remains operational, irrespective of the position of the INT/EXT switch.

9.9.4 *Mute circuit (Fig. 9.10)*

The sound can be muted in various ways in the output amplifiers:

- When the supply voltage becomes smaller than +6V or -6V, the IC will automatically interrupt its non-inverting input. This IC therefore automatically suppresses unwanted signals when switching on and switching off.
- The mute can also be activated externally (active low) via the AMP-MUTE2 line, which originates from the mP. This mute is switched off by the remote control, blue mute, programme switching, etc.
- When switching on the mains voltage, electrolytic capacitor 2788 forms a brief short-circuit, as a result of which the voltage is held low at point 2, as a result of which the IC is muted. This avoids a plop when switching on.

9 9 5 *Protecting the audio output stage (Fig. 9.10)*

The supply voltage of the output amplifiers is symmetrical (+16V and -16V). Therefore the outputs from the amplifiers are connected directly to the loudspeakers.

Therefore, during normal operation the output signal contains no DC components. C2761 can absorb any small fluctuations.

If one of the supply voltages now becomes too high or too low or if DC components arrive on one of the outputs because, for example, an IC is faulty, then TS7760 or TS7761 will start to conduct. As a result of this a current flows through R3760 which causes TS7762 to conduct.

The DC-PROT / STBY line therefore comes to 5V, as a result of which the Audio Power Supply goes into protection.

If the positive and the negative supply voltages reduce simultaneously, the voltage on C2761 remains at approximately 0V.

On the centre signal there is a DC voltage of approximately 6V, this is on the emitter of TS7767.

When the +16V becomes lower than 11V, TS7767 and thus TS7760 start to conduct and the DC-PROT signal will still be activated.

In stand-by the 16V supply voltage is switched off; the DC voltage on the centre signal is 0V and TS7767 does not conduct. The C AC signal is max. 0.5V and does not influence the circuit.

9.9.6 *DBE circuit*

DBE or 'Dynamic Bass Enhancement' is used in order to obtain an improved lower tone reproduction using the same subwoofer.

- Circuit 1 adds the L and R signals (the subwoofer requires the low information of both signals) and sends this added signal through a low-pass filter. All frequencies higher than 270 Hz are feedback intensely.
- Circuit 2 has a suppression at 70 Hz (90 Hz for Acoustic Horn).
- Circuit 3 has a frequency-dependent feedback. At 60 Hz the feedback resistance, and thus the amplification too is the greatest. D6720 and D6721 form a limiter if the signals one too large. Circuits 2 and 3 together form an amplification of the frequencies around 60 Hz.
- Circuit 4 is an invertor which 'rectifies' the signal again before it goes to the output amplifier of the subwoofer. By using this stage the amplification factor can still be changed if required. At the same time R3728 and C2728 form a filter which truncate all harmonics above 700 Hz which are caused by the DBE circuit.

9.10 Audio path on the Dolby Audio Module for Double Window (Fig. 9.11)

The 'Double Window' feature also has consequences on the audio section. For Double Window it applies that the sound of the main picture (the left picture) always goes to the loudspeakers, while the sound of the second picture (the right picture) goes to the main headphones.

The additional headphone selection takes place by using an additional switch SK4 and TDA9860.

SK4 provides the selection for the various audio sources, while TDA9860 makes the selection between:

- The classic headphones.
- Double Window headphones originating from an external audio source (SK4).
- The mono signal originating from the tuner on the Full Double Window module.

The configuration around SK1 is identical to that of MD2.1 with the difference that in the MD2.1 this switch was mounted on the SSP and all signals required in the MD2.2 are supplied to the Audio Module via a ribbon cable from the SSP, where the switch is now mounted.

Because SK1 is now on the Audio Module, SK4 can now be switched parallel directly here. This HEF provides the selection of the various audio sources for the headphones in Double Window. SK4 is driven by 2 bits of IC7590 which are applied via I^2C.

Both HEF's are supplied with an 8V5 power supply which comes from the SSP.

For SK1 there are two inputs for front: front L/R and front L/L. As a result of this it is possible to place a mono signal, originating from the front, onto both the left-hand and the right-hand channel.

However, SK4 has no automatic answer to both channels for the front input (all inputs are occupied), for a mono front signal only the left-hand loudspeaker will be driven to full power.

This is solved by IC7590. For a mono signal IC7590 places the mono signal on both the left-hand and the right-hand side. IC7590 is a TDA9860 which is also used in the GFL. However, for the MD2.2, 3 functions of the IC are used as additional functions with regard to the GFL (the remaining functions are 1 to 1 identical):

- The selector switch
- The volume control: which can now no longer be executed on MSP3410 because not all audio sources are offered to MSP3410 for the 'Video Dualscreen' headphones.
- The 2 control bits (pin 2, 31) for SK4.

Ultimately the input of IC7590 is sent to the headphones amplifier.

Wireless dolby

9.11 Transmitter (Fig. 9.12)

9.11.1 *Block diagram*

We can recognise 3 basic blocks in the block diagram of the transmitter:

1 FM transmitter (1403)
   The FM transmitter is a screened module which is I^2C controlled by the main-μC of the TV:
   - ★ At program switching the incoming surround sound signal from the Dolby Audio Module is muted (by the dolby IC SAA7710)) to avoid plops in the surround speakers.
   - ★ At switching off the surround mode, first the incoming surround sound signal is muted (to avoid plops) and then the local oscillator in the transmitter is switched off. As the local oscillator is switched off also the 19 kHz pilot and the 433 MHz carrier are no longer be transmitted any more, which is recognised by the receiver. In that case after 15 seconds the receiver switches to standby.
   - ★ Selection between the 7 channels around the 433 MHz.

2 Audio path
   The basic audio path contains of plug 1409, input buffer IC7401A, a 15 kHz low pass filter L5401 (prevent high frequencies to the compander), a compander (IC7403 and IC7402B) and a buffer IC7404A.

3 Pilot generator
   Although the transmitter transmits a mono signal, a pilot at 19 kHz pilot is used to enable the receiver to recognise whether the received signal is the wanted signal. This 19 kHz pilot is generated by an 38 kHz oscillator and a 2-divider around IC7404D/C.
   Just before injection the pilot is added with the companded and buffered mono surround signal.

9.11.2 *Compander*

As the transmitter is an FM-transmitter, the amplitude of the audio and pilot signal is 'real time' converted into a FM-sweep. Large amplitudes are converted into a large FM-sweeps, small amplitudes into a small FM-sweeps. Small FM-sweeps have a bad signal to noise ratio and large FM-sweeps increase the required bandwidth.

Therefore a so called 'compander' is used to limit the bandwidth and to increase the signal to noise ratio of the transmission. This compander attenuates large amplitudes (e.g. +10 dB to +5 dB), bypass middle amplitudes (0 dB to 0 dB) and boosts small amplitudes (e.g. -20 dB to -10 dB). On the receiver part this correction is corrected back by a so called 'expander'.

The basic compander configuration is given below. There is a variable gain cell (variable resistor inside NE572) in the feedback loop of an Op Amp (NJM). The resistance of the gain cell is controlled by the voltage across C2408 which is charged by the rectifier.

9.11.3 *Pilot generation*

The pilot oscillator is build around a 38 kHz tuning crystal 5403. Two inverters IC7404E and IC7404F - used as amplifiers - are used to make a buffered 38 kHz square wave signal.

The 38 kHz block is divided by 2 by the circuitry around the inverters IC7404D and IC7404C.

- On the moment the 38 kHz block becomes 'high', D6401 and TS7405 conduct. Via D6401 the input from IC7404D becomes 'high'. The output of IC7404D becomes 'low' and so the output of IC7404C becomes 'high' and keeps the input of IC7404D 'high'.
  As TS7405 conducts, C2438 is charged.
- On the moment the 38 kHz block becomes 'low', D6401 and TS7405 block. By now C2438 is discharged via R3449 as the input of IC7404C is still 'low'.
- On the moment the 38 kHz block becomes 'high' again, D6401 and TS7405 conduct. By now the input of IC7404D becomes 'low' as C2438 is still 'low' and TS7405 conduct. This 'low' on the input from IC7404D is long enough 'low' (via D6401 it wants to become 'high' again), to trigger the hold-circuitry IC7404D and IC7404C to a 'low' state.

The output is a sine wave due to the low pass filter R3450 and C2439. TS7406 is a buffer of the 18 kHz pilot generator.

9.11.4 *Pilot and companded surround sound adding*

The buffered and companded mono surround signal is fed to TS7410. This TS7410 has 3 functions:

- Adding the buffered and companded surround signal with the 19 kHz pilot.
- Buffer for the surround signal.
- Low-pass filter at 60 kHz via C2435.

Before injection into the modulator input there is the provision to align the maximum modulation (maximum FM sweep of 75 kHz) with potentiometer 3442.

9.12 Master and slave speaker box (Fig. 9.13)

9.12.1 *General*

The master and slave speaker box can be used wireless and wired. In case the system is used wired the cinch-plug on the master is used as input and the system automatically switches into the wired mode (by then as incoming signal from the TV the amplified surround signal from the rear speaker clickfit connector of the TV is used). Both wired and wireless make use of the amplifier in the master box. The slave box is a loudspeaker only which is driven by the master box. The following main circuitries are located inside the master box:

- Supply
- Receiver
- Amplifier

9.12.2 *Supply*

The supply consists of two conventional 50 Hz mains supplies.

- The standby supply is built up around mains transformer 5312. This standby supply starts immediately when the mains-switch TV-3 is switched on. By then via bridge rectifier D6312-6315 and stabiliser TS7275 the supply voltages V! and V2! are present.
- The main supply is built up around mains transformer 5313. This main supply is only active when the set is in normal operation and takes over the largest part of the energy delivery to stabiliser 7275 via D6260. In normal operation STBY_COM! is 'high', TS7273 blocks, TS7274 blocks, via R3316 TS7310 conducts and so relais 5310 is energized and the switch is closed.

Different situations:

- *Start up*
  At start up the system with mains switch TV-3, C2293 is charged but is even discharged faster via the 2 diodes D6278 and D6277. TS7272 blocks, TS7274 blocks, TS7310 conducts and so both supplies start up immediately.
- *Switch off*
  At switching off the system with mains switch TV-3, C2293 is not discharged any more via the 2 diodes D6278 and D6277. As a result C2293 is charged quickly and so immediately switches off the main supply. In this way a switch-off plop is prevented.
- *STBY_COM!*
  In case the STBY_COM! signal becomes 'low', the system must go into standby mode. In case STBY_COM! becomes 'low', TS7273 conduct, TS7274 conduct, TS7310 blocks and the main supply is switched off.
- If STBY_COM! is 'low' TS7265 will conduct and switch on the red LED. If STBY_COM is 'high', TS7265 blocks, TS7266 conducts and so the green LED is switched on.
  - ★ STBY_COM! 'low' → receiver in standby mode, main supply switched off, red LED
  - ★ STBY_COM! 'high' → receiver in normal operation, main supply switched on, green LED

9.12.3 *Receiver*

9.12.3.1 *Block diagram*

We can recognise 4 basic blocks in this diagram:

1. Frontend (1710):
   Here the incoming 433 MHz aerial signal is filtered, amplified and via a mixer converted to a fixed 10.7 MHz IF frequency. The frontend is housed in a separate shielding unit to minimise the local oscillator radiation. There is an antenna connected to the input of the frontend.
2. IF and decoder part (7710):
   Here the 10.7 MHz IF signal is filtered via 2 standard FM ceramic filters and fed to the IF FM-demodulator IC7710. In this IF FM-demodulator the mono surround signal is demodulated and the field strength and the presence of the pilot of the incoming 10.7 MHz signal is measured.
3. Audio path:
   The received audio signal is filtered and expanded in dynamic range, to correct the companding circuitry at the transmitter side. This circuit uses the NE572 hi-performance circuit with an extra opamp. Basically this circuit multiples the incoming dynamic range with a factor of 2 dB.
4. Microcomputer (7750):
   The μC reads the position of the 7-fold channel switch, controls the frontend via I^2C and drives its mute pin.

9.12.3.2 *IF demodulator*

To make discrimination possible between the 7 channels that can be selected some selectivity has to made at the IF channel. Two standard 10.7 MHz ceramic filters with TS7707
in between are used for optimal behaviour towards S/N.

The IF-demodulator IC7710 (LA1805) has a main IF amplifier, and a FM and AM (not used) detector.

The IF-signal comes in at pin 1 and is boosted by a very high gain to a level where it is suitable for detection.

The detector needs a quadrature coil at pin 20.

The detected signal comes out at pin 17 and goes in again at pin 16. The stereodecoder is used for pilot detection only and is a classic system with a VCO (Voltage Controlled Oscillator) running at 152 kHz which can be adjusted by potentiometer 3721.

The AF outputs (pin 9 or/and 10) are filtered and amplified before they are presented to the expanding circuit. The filter 5730 is a double notch filter with filters out peaks at 19 and 38 kHz.

9.12.3.3 *Expander circuit (IC7770)*

The key IC is the NE572 which is used as an expander. Via this expander, the compander function in the transmitter side is corrected. This expander boost the high amplitudes (e.g. +5 dB to +10 dB), bypass middle amplitudes
(0 dB to 0 dB) and attenuates low amplitudes
(e.g. -10 dB to -20 dB).

The circuit is in fact a standard opamp (NJM) circuit where the input series resistor is formed by a gain cell. This gain cell is a variable resistor that is driven by a current that is obtained by rectifying the input current. Any variation of the cell impedance will change the gain of the main opamp NJM4560. Now the input of the gain cell and the rectifier are tied to the same level. When the input signal Vin drops by e.g. 6 dB, then the gain control current from the rectifier will also decrease with 6 dB (factor of 2). Therefore the total change in Vout will be 12 dB, giving in fact a factor 2 (in dB) expansion. The detector circuit rectifies the input signal current. The V_{REF} for the opamp is extracted out of the NE572 IC via proper RC elements.

9.12.3.4 *Microcomputer (IC7750)*

The microcontroller is a MC68HC05 type with 1.2 kbit ROM and 14 I/O lines. The μC clock frequency is derived from a ceramic resonator of 4 MHz.

The internal clock is divided down to 500 kHz internally.

The reset circuitry around TS7755 creates a POR for the μC to assure that the μC only starts its program when the supply voltage is stable enough. The μC has the following functions:

- Read the setting of the 7 position slide switch continuously. In an internal look-up table the 7 required frequencies for the local oscillator are stored.
  The μC controls the local oscillator in the frontend 1710 to 1 of the 7 desired channels via the I^2C bus. The output towards the synthesiser chip in the front-end is in I^2C format, however there is no real handshaking as the synthesiser is the only device on the bus.
- In case the μC operates a channel switch, pin 11 is made 'high' for a moment. This to prevent plops when switching from one channel to another.
- In case the μC has detected that the receiver 1710 has received an incoming signal which is under the threshold level for more than 90 seconds, than pin 11 is made 'high' constantly.

9.12.3.5 *MUTE signal*

The MUTE signal on pin 5 of plug 1791 is 'high' in one of the following possibilities (OR-function):

- In case the 10.7 MHz field strength at the input of the IF-detector IC7710 is not strong enough. By then pin 8 of the IF-demodulator IC7710 and so - via D6710 - the MUTE signal becomes 'high'.
- In case the 19 kHz pilot-tone is not detected, pin 7 of the IF-detector IC7710 and so via D3710 the MUTE signal becomes 'high'. Even though the transmission is mono, this pilot tone is used and detected just to recognise that the received signal is the required signal.
- In case the μC operates a channel switch, pin 11 is made 'high' for a moment. This to prevent plops when switching from one channel to another.
- In case the μC has detected that the receiver 1710 has received an incoming signal which is under the threshold level for more than 90 seconds, than pin 11 is made 'high' constantly.

This MUTE signal is used for:

- Direct muting of the AUDIO signal at pin 2 of 1791 via mute circuitry TS7784 and TS7789. These transistors are connected inverse (collector and emitter are changed), but the functionality is the same. In case MUTE is high, the base-collector diode conducts and short the AUDIO signal via the emitter to the collector. In this way a better MUTE behaviour is obtained.
- Further this MUTE signal is fed to the circuitry which drives the STBY_COM! on the amplifier module.
  In case the MUTE signal is 'high' for more than 15 seconds, the STBY_COM! becomes 'low' and the receiver is switched to standby mode (see wireless mode).

9.12.4 *Amplifier*

This module can be used in two modes:

- Wireless mode
- Wired mode

9.12.4.1 *Wireless mode*

The amplified surround audio signal at the clickfits (diagram H2) can also be wired to the master box.

The input from the receiver is present at pin 2 of connector 1262 and fed via the emitter of TS7268 to the input of the amplifier. This signal can be connected to ground by TS7269 in case the STBY_COM! signal 'low' is. Pin 5 of 1262 is the mute pin.

When the MUTE is 'high', TS7270 conducts and pin 3 of comparator IC7262A becomes lower as the V_{REF} at pin 2 (4V6). As a result C2280 discharges via R3280. In wireless mode, the V_{REF} at pin 6 of IC7262B is 6V, and so it takes 15 seconds before pin 5 becomes lower as pin 6 of IC7262B. So in case the mute from the receiver is active for 15 seconds, by then the STBY_COM! will become 'low' and will switch the system to standby.

9.12.4.2 *Wired mode*

In case of wired use the switch in the cinch connector is open and so the supply voltage for the receiver at pin 3 of 1262 is not present any more. The audio signal - via pin 2 of plug 1260 - is fed to the AUDIO-IN! signal and to the low-level detector.

In wired use, the mute signal from the receiver-module should be disabled. If there is no voltage on pin 3 of 1262, pin 5 of 1262 will be forced high by R3305 and D6275 which means a mute state. This will force TS7270 in conduction as long as the wired mode is active. In this way D6276 is blocked and so the receiver-mute is disabled

In the wired mode, a low-level detector is used, made by the circuitry around IC7260B and TS7260A. IC7260B and IC7206A are used as amplifier. The voltage divider R3320 and R3321 is used to limit the input signal to IC7260. C2269, C2295 and C2289 are used to block the DC-components. Via D6271 and D6272 only the positive pulses are fed though to pin 3 of comparator IC7262A

Only in case the audio level at the input of the low-level detector is lower as 3mV-RMS, pin 3 of comparator IC7262A becomes lower as the V_{REF} (4V6) at pin 2 and so the output at pin 1 IC7262A becomes 'low'.

As long as the input of the low-level detector is lower as 3mV-RMS, output pin 1 of IC7262A is 'low' and so C2280 is discharged via R3280. In case of a wired mode the threshold-level of comparator IC7262B is increased by a current through D6266 and R3277. As a result in wired mode the threshold level at pin 6 is decreased to 1V3.

Therefor it takes 90 seconds before the discharged C2280 becomes lower than pin 6 of IC7262B. So only in case of 90 seconds no (or too low) sound, the STBY_COM! becomes 'low' and will switch the system to standby.

9 12 4 3 Amplifier

- IC7267 is the amplifier for both the master and the slave loudspeaker. It has an output power of 2x8W.
- To ensure a proper start up of the amplifier IC from standby to normal operation, pin 1 is used.
  Pin 1 filters the supply voltage at pin 12.
  * In normal operation STBY_COM! and so pin 6 of the IC is 'high' and so internally pin 12 is connected to pin 1.
  * In standby pin 6 is 'low' and so pin 12 is not connected any more to pin 1. During standby C2286 is precharged via the high STANDBY. This is done to realise a fast built up of the voltage at C2286 when the set is going from standby to normal operation in case of a bad charging of C2286 through IC7267.
- D6265 is used to charge C2282 to avoid plops at switching on.
- From normal operation to standby the following takes place in time:
  * Main supply of transformer L5513 is switched off inmediately, but C2314 is still charged.
  * Then C2290 is charged by the 'low' STBY_COM! signal and so - via the conducting TS7269 and TS7268 - the AUDIO-IN signal is muted.
  * Then C2284 is discharged by the 'low' STBY_COM! signal and so the standby pin 6 of amplifier IC7267 becomes 'low'. The amplifier is switched off after the AUDIO_IN is muted to avoid plops.
  * Then C2314 of the main supply is discharged and only the supply of L5312 is supplying energy to the stabiliser 7275.

DualScreen

9.13 Introduction

The wide picture version of the MD2.2 chassis can be provided with the DualScreen feature. In this there are two variants which can be distinguished:

- In the most basic version TXT or nexTView can be displayed next to the main picture. This is called 'text DualScreen'.
- In a higher specified sector it is possible, in addition to this, to display two video pictures simultaneously next to each other on the screen. This is called 'Video DualScreen'. When combined with text DualScreen this is designated as 'full DualScreen'.

Text DualScreen (video/TXT or video/nexTView)

The picture is divided into two, in a horizontal ratio of 60/40. These two parts are filled as follows:

- The video information is compressed horizontally and pushed left to the left-hand 60% of the picture by means of the PANIC on the Feature Box.
- The TXT or nexTView information is compressed horizontally and pushed right to the right-hand 40% of the picture by means of a circuit on the TXT+control module.

The total picture is further compressed vertically by means of the DDP.

Video DualScreen (video/video with sound of the second video picture on the headphones plug)

Two different video pictures are displayed next to each other in a horizontal ratio of 50/50, whereby the sound of the second video channel is fed to the headphone plug. This is achieved using the so-called 'video DualScreen' and 'YUV interface' modules and modified Dolby Audio Module:

- The 1fH YUV main signal is branched off immediately after TDA9143 on the SSP via the YUV interface panel and is fed to the Video DualScreen module.
- The 1fH YUV sub-signal from the second video picture is created on the Video DualScreen module by means of a 2nd tuner, an MF-demodulator and a TDA 9143.
- The YUV main and sub-signals are placed next to each other in the PIPO (Picture In Picture Out). The YUV output signal (YUV-DW) is still always on the base of 1fH and is fed back to the YUV interface. There is a YUV switch on the YUV interface:
  * If the Video DualScreen feature is not activated, the YUV main signal from TDA9143 on the SSP is immediately looped through to the Feature Box.
  * If the Video DualScreen feature is activated, the YUV-DW signal is fed to the Feature Box.

If the Video DualScreen feature is activated, the sound of the second video channel is fed to the headphones plug via a modified Dolby Audio Module.

9.14 Text DualScreen

9.14.1 *Horizontal compression of the TXT/nexTView information (Fig. 9.14)*

Principle

- SK1 and SK2 are components of the Blending circuit (see chapter Video Processing).
- The TXT information is compressed by the RGB info to be written into a memory and then read out on a double frequency.
- In order to be able to display the TXT information in the 40% screen, all level 2.5 features, including the side panel feature, are switched off by the software. The maximum number of characters which can be displayed per line is reduced from 56 to 40. Since nexTView also makes use of these possibilities it also has the result that the layout of this is modified in nexTView DualScreen mode.
- In order to set the analogue RGB signals at the correct digital level for the memory IC7462 (after all, this IC can only process digital information), an additional buffer has to be fitted between IC7462 and the TXT-IC, IC7400, namely IC7461. Because IC 7461 also inverts the signal, then after reading out from IC7462 an inverter IC7463 is used in order to 'straighten' the signal again.
- Because IC7461 discriminates the RGB (and FBL) level to high or low (no longer any interim steps) TXT level 2.5 colours (32 colours) is automatically returned to TXT level 1.5 colours (8 colours) if text DualScreen is active.
- With the DWE (Double Window Enable) switch line, originating from the operating mP, a selection is made between a complete TXT/nexTView picture or a DualScreen. If DWE is low, the text DualScreen is displayed.

Remark:
Due to the software suppression of level 2.5 features in DualScreen mode, then not only will the side panel feature be switched off but also the background colours, DRCS, etc.

Writing to and reading out of the memory

- The TMS4C1050B (IC7462) is a 4 bit organized memory. This memory is addressed via 2 independently operating reading and writing address counters. In addition to this the IC has a separate data write bus A and a separate data read bus B.
- The D0, D1, D2, D3 inputs are used to write the Blanking and RGB signals into the memory. The following signals are used to control the writing section:
  * **W**rite enable (W) releases the write address counter and gives permission for data to be written into the memory.
  * **R**e**S**e**T W**rite (RSTW) provides a reset for the write address counter.
  * **S**erial **W**rite **C**loc**K** (SWCK) is a clock signal which determines the writing speed of the memory.
- The Q0, Q1, Q2, Q3 outputs are used to read out the Blanking and RGB signals from the memory.
  The following signals are used to drive the reading section:
  * **R**ead enable (R) releases the read address counter and gives permission for data to be read out of the memory.
  * **R**e**S**e**T R**ead (RSTR) provides a reset for the read address counter.
  * **S**erial **R**ead **C**loc**K** (SRCK) is a clock signal which determines the reading speed of the memory.

In text DualScreen the frequency of the read clock is double that of the write clock.

Creating the clock signals in order to be able to read and write in the Field Memory

In order to provide the memory IC, IC7462, with the required clock pulses, the following circuits are made:

- The TXT-IC gives pin 39 a TCASIN with a frequency of 12 MHz with its harmonic. A band pass filter, with an adjustable coil L5465, only allows the 2nd harmonic to pass. This 24 MHz is used directly as a read clock (SRCK). In order to obtain a synchronous running writing clock (SWCK) which is exactly half the speed of the read clock, the signal is driven through a 2 divider IC7465/A.
- The TXT/IC delivers on pin 3 a line frequency pulse with a duty-cycle of exactly 50% (signal PL). This pulse is used as the clock input for the 2nd flip flop IC7465/B. The vertical flyback pulse (VFB) arrives on the D input. A reset read (RSTR) and a reset write (RSTW) are therefore generated at raster frequency. Since there is a time difference between the two trigger points (rising slope) of these reset signals, the 12 MHz clock is held up to the START moment. In this way the writing and reading are exactly synchronized.
- At the START moment the RSTR is high. As a result of this the 12 MHz write clock is released and the writing into the memory begins. This is exactly at the rising PL slope. The writing is now no longer interrupted until a further frame flyback. A full raster is therefore written into the memory.
- The reading of the memory is stopped just at the moment of START (Read enable is low). Only in the second half of the PL pulse (this is a half line time later) does the Read Enable become high. As a result of this the read address counter is released and the reading out of the memory starts. Since the read address counter is running at 24 MHz clock this reading out runs twice as fast as the writing. Another half a line time later the Read Enable again becomes low and reading out stops again.
  This cycle repeats itself for each line.
  * During the first half of the line the PL is high, the read enable (R) is therefore low; nothing is therefore read out.
  * During the second half of the line the PL is low and the memory is read out at double speed (24 MHz clock)

9.14.2 *Horizontal compression of the video information*

In addition to the compression of the TXT/nexTView section, the video section of the picture should also be compressed. For text DualScreen this horizontal compression is achieved by the PANIC IC in the FBX. Via a software command the picture is compressed in the PANIC and pushed horizontally to the left.

9.14.3 *Horizontal centring of text DualScreen*

In order to arrange the video and TXT/nexTView information neatly at the correct distance beside each other, initially the TXT/nexTView half on the right is set against the side of the picture by the DDP. After this, by means of the software centring of the FBX, the video half is set to the correct horizontal distance with regard to the TXT/nexTView information.

9.14.4 *Vertical compression of the text DualScreen picture*

The total picture for text DualScreen is compressed vertically with the aid of the DDP (vertical deflection is adjusted) in order to again obtain the correct height/width ratio of the video picture. As a result of this black bars are created on the top and bottom of the picture.

9.15 Video DualScreen

9.15.1 *Introduction*

The video DualScreen picture consists of 2 sections of the same size:

- the left-hand section is the main picture originating from the main tuner or from RGB, CVBS or SVHS signals from external sources.
- the right-hand section is the sub-image originating from the 2nd tuner or from CVBS or SVHS signals (no RGB signals) from external sources. The video decoding for the sub-image takes place on the Video DualScreen module and makes no use of the COMB filter. The result is that the picture quality of the sub-image is generally less than that of the main picture.

9.15.2 *Block diagram*

The following blocks can be distinguished on the Video DualScreen:

- PLL tuner E9F1 is a UV1216D which is driven via I^2C.
- A TDA9815 is used for MF demodulation.
  The PCF8574AT controller IC9N is used in order to set the switching signals from the MF demodulator into the correct mode.
- Via a source selector IC9L a selection is made between TUN_CVBS (from the Video DualScreen tuner) or CVBS PIP (from the TEA6415 source selector on the SSP). At the same time this IC9L can be used to select between CVBS-PIP or YC-PIP.
- The Y/CVBS-PIP or CVBS TUNER signal and the C-PIP signal are fed to the TDA9143 IC9J on the Video DualScreen module. Together with the delay line IC9K the CVBS or SVHS signal is converted here to the SUB-YUV signals together with the sync signals SPHsync and SPVsync. The RGB-TXT inputs of this TDA9143 are not used here.
- The sub-YUV signals (SY, SU, SV) together with their sync signals SPVsync and SPHsync and the Main-YUV signals (MU, MY, MV) with their sync signals HA = SC_1fH = DPVsync are placed next to each other in the PIPO (Picture In Picture Out) IC9A SAB9077. The RAM IC9E is used as the memory.
- The output of the SAB9077 DW-YUV signals (DY, DU, DV) are fed directly to the output of the Video DualScreen panel to the YUV interface (in the MD2.2 the function of the switching IC IC9M is on the YUV interface, therefore IC9M and the switching signals DFB1 and DFB2 are not used). Via the switching signal FBLK the YUV interface can be set to the bypass mode (FBLK 'low') or to the Video DualScreen mode (FBLK 'high').
- If the Video DualScreen feature is not active, part of the +5V supply voltages (+5VSW) is switched off via Q9N1 and switching signal VDS STANDBY (VDS STANDBY becomes 'low' (standby mode) 60 seconds after the VDS feature is switched off. As a result of this the load of the +5V supply voltage reduces if the Video DualScreen feature is not used. Because the PIPO is also switched off, then via IC9P and VDS TSNADBY = 'low', the HA and VA sync signals are not looped through to the HA' and VA' sync signals which go to the PIPO. This prevents the non-active PIPO loading the HA and VA signals.
- Because the TXT/nexTView DualScreen are created by a totally different signal path in the MD2.2, connector J9A5, J9A6, the buffers around Q9P1, Q9R1 and Q9S1 and the section of pin 12, 13, 14 of IC9L are not used.

9.15.3 *Tuner and MF section*

The tuner is an I^2C controlled PLL tuner with built-in splitter. The antenna input goes to the Video DualScreen module and is split there into the main and Video DualScreen tuner. The D_TUN pin 8 is the supply for the splitter section. The ADDRESS pin 15 is used to give this tuner a different address on the I^2C bus of the main tuner.

The MF section can handle all of the systems throughout the world and is constructed around the MF demodulator IC9R, the TDA9815 (also used in GR2.4). This is, with regard to pinning, the same as the TDA9811 of the MD2 MF module, however, in the TDA9815 an FM demodulator is built in. In order to select the correct demodulation system and the correct filtering, the following switching signals are used. These switching signals originate from the PCF8574AT IC9N.

System	BG/LL'IMDK	L'	I	POS/NEG	M
BG	1	0	0	1	0
L	0	0	0	0	0
L'	0	1	0	0	0
I	0	1	1	1	0
M	0	0	0	1	1
DK	0	0	0	1	0

The video path

- *BG via SAW filter FL90*
  BG/LL'IDKM is 'high', D9G0 conducts, D9G1 reverses. As a result of this IF2 becomes short-circuited and IF1 is fed to the Video IF inputs pin 1 and 2 of the TDA9815 via the BG SAW filter FL90.
- *LL'IDK via SAW filter FL91*
  BG/LL'IDKM is 'low', D9G0 reverses, D9G1 conducts. As a result of this IF1 becomes short-circuited. Because M-TRAP is 'low', D6G2 reverses and D9G3 conducts as a result of which the IF2 is fed to the LL'IDK SAW filter FL91.
  At the same time D9G5 conducts and D9G4 reverses because M-TRAP is 'low'. As a result of this pin 4 and 5 of FL92 (M SAW filter) become short-circuited and pins 5 and 4 of FL91 (LL'IDK SAW filter) are not short-circuited. Therefore, pins 5 and 4 of FL91 are looped through to pins 4 and 5 of TDA9815 respectively.
  The circuit around L9F2 filters out the sound at 40.4 MHz from the adjacent channel.
- *M via SAW filter FL92*
  BG/LL'IDKM is 'low', D9G0 reverses, D9G1 conducts. As a result of this IF1 becomes short-circuited. Because M-TRAP is 'high', D6G2 conducts and D9G3 reverses as a result of which the IF2 is fed to the M SAW filter FL92.
  At the same time D9G5 reverses and D9G4 conducts because M-TRAP is 'high'. As a result of this pins 4 and 5 of FL91 (LL'IDK SAW filter) are short-circuited and pins 5 and 4 of FL92 (M SAW filter) are not short-circuited. Therefore, pin 4 and 5 of FL92 are looped through to pins 4 and 5 respectively of the TDA9815.
- Pin 30 selects the MF inputs: 'high' for the BG VIF inputs pin 1-2 and 'low' for the LL'IDKM VIF inputs pin 4-5.
- In order to filter sound from the Video IF (VIF), the series connected band reversing filters X9T4, X9T5 and X9T6 are used. X9T4 is only connected in series in the M mode (M-TRAP 'high' therefore Q9F5 reverses and Q9F6 conducts). Pin 21 is the output, pin 22 the input. Finally, the buffered TUN-CVBS signal is present on pin 10.
- AFC oscillator between pins 23 and 24 which is adjusted to 77.8 MHz (2 x 38.9 MHz). The adjustment takes place via pin 23 of the AFC detector. The AFC loop of the Video DualScreen demodulator is not used. The AFC loop of the main demodulator on the IF module of the set itself is used to correct any drift of the transmitter for both the main tuner and for the Video DualScreen.
- Pin 9 is 'high' for BGIDKM (negative modulation) and 'low' for LL' (positive modulation).
- Pin 11 is 'low' in the L' mode (L' 'high') or in the M mode (M-TRAP 'high') via Q9F1. A low pin 11 is interpreted in the positive modulation mode
  (pin 9 'low') in order to de-tune the 38.9 MHz to 32.4 MHz. In the negative modulation mode
  (pin 9 'high') a low pin 11 is interpreted in order to select sound input pin 18 (M audio input) instead of the sound input pin 17 (BGLL'IDK audio input).
- Pin 7 is switchable for the PLL loop filter. For BGIDKM, R9H9 is short-circuited via Q9F2 as a result of which the time constant is changed.
- Pin 6 is used in order to adjust the AGC takeover point via R9H5.

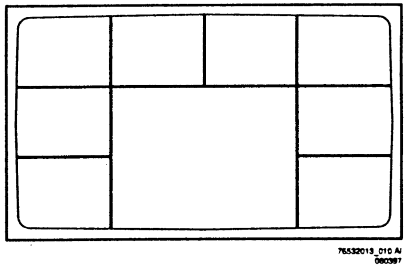
The sound path

The TDA9815 delivers an FM mono or AM mono. Via L9F8 the sound path is disconnected from the picture path.

- *BG via SAW filter FL93*
  L' is 'low', D9G8 conducts, D9G9 reverses, pin 6 of the L9F8 is short-circuited via C9T5. Therefore, the MF signal from the tuner is fed via pin 4 of L9F8 to pin 1 of FL93 (BG SAW filter) and pin 2 of FL94 (LIDK SAW filter). Because BG/LL'IMDK is 'high', D9G6 conducts and D9G7 reverses. As a result of this pins 4 and 5 of FL94 (LIDK SAW filter) are short-circuited and pins 5 and 4 of FL93 (BG SAW filter) are not short-circuited. Pins 5 and 4 of FL93 (BG SAW filter) are looped through to pins 31 and 32 of TDA9815 respectively.
- *LIDK via pin 2 SAW filter FL94*
  L' is 'low', D9G8 conducts, D9G9 reverses, pin 6 of the L9F8 is short-circuited via C9T5. Therefore, the MF signal from the tuner is fed via pin 4 of L9F8 to pin 1 of FL93 (BG SAW filter) and pin 2 of FL94 (LIDK SAW filter). Because BG/LL'IMDK is 'low', D9G6 reverses and D9G7 conducts. As a result of this pins 5 and 4 of FL93 (BG SAW filter) are short-circuited and pins 5 and 4 of FL94 (LIDK SAW filter) are not short-circuited. Pins 5 and 4 of FL94 (LIDK SAW filter) are looped through to pins 32 and 31 of TDA9815 respectively.
- *L' via pin 1 SAW filter FL94*
  L' is 'high', D9G8 reverses, D9G9 conducts, pin 4 of the L9FB is short-circuited via C9T5. Therefore, the MF signal from the tuner is enabled via pin 6 of L9F8 to pin 1 input of FL94 (L' SAW filter). Because BG/LL'IMDK is 'low', pins 4 and 5 of FL94 are looped through to pins 31 and 32 of TDA9815 respectively.
- *M sound inter-carrier*
  In M mode the sound inter-carrier is processed, therefore the sound is extracted from the VIF information. Because the sound path is not used it is disabled by Q9F7.
- In order to filter the sound signal (SIF) from the picture the band reverse filters X9T0, X9T1, X9T2 and X9T3 are used. Pin 20 is the output, pin 18 the input for M sound and pin 17 the input for BGLL'IDK sound.
  Filter X9T1 (6.0 MHz) is switched off in the BG mode in order to prevent any NICAM BG carrier (5.85 MHz) from passing and filter X9T2 (6.5 MHz) is switched off in the I mode in order to prevent any NICAM I carrier (6.552 MHz) from passing.
- Pin 12 is the DW-MONO output. Via Q921 the de-emphasis for BGIDKM can be modified and additionally modified for M via Q922.

9.15.4 *MultiScreen with the PIPO*

In a set with the Video DualScreen module, Multi PIP is no longer created but MultiScreen is created with the aid of the PIPO SAB9077. In the MD2.2 the following configuration is selected:



For this the large picture is the main picture from the main tuner. The 8 small pictures are created by the Video DualScreen tuner. At the same time a scan or photofinish can be created with the 8 small pictures, for which the picture at the bottom right is the live picture.

Circuit description / Schaltungsbeschreibung / Description des circuiteries

PULSES ON T5305

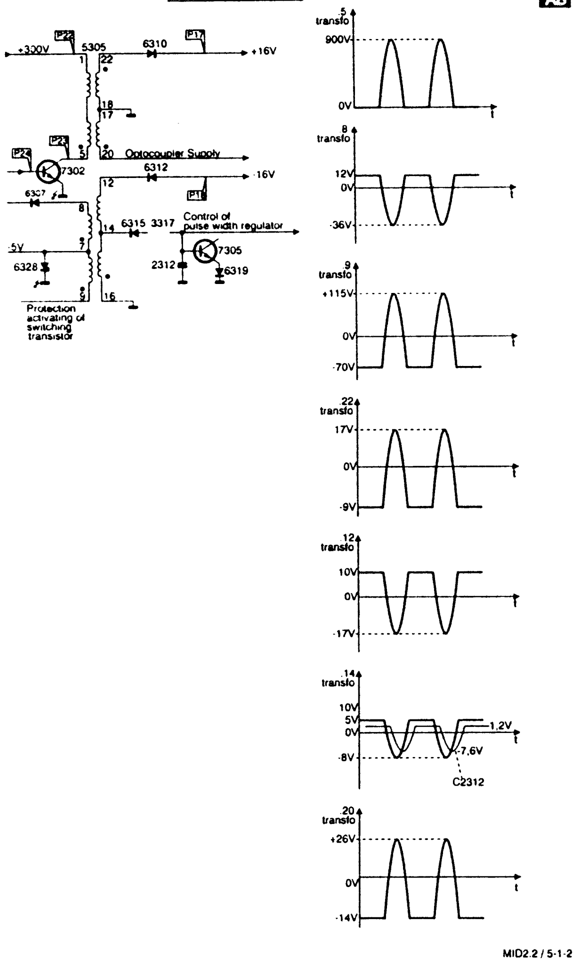

+300V
P22
5305
1
22
6310
P17
+16V
18
17
P23
P24
5
20
Optocoupler Supply
7302
6312
12
-16V
P18
6307
8
14
6315
3317
Control of
pulse width regulator
-5V
7
6328
2312
7305
6319
9
16
Protection
activating of
switching
transistor
5 transfo
900V
0V
t
8 transfo
12V
0V
-36V
9 transfo
+115V
0V
-70V
22 transfo
17V
0V
-9V
12 transfo
10V
0V
-17V
14 transfo
10V
5V
0V
-8V
1,2V
7,6V
C2312
20 transfo
+26V
0V
-14V
MID2.2 / 5-1-2

Fig. 9.1

START UP, -5V, SELF OSCILLATION

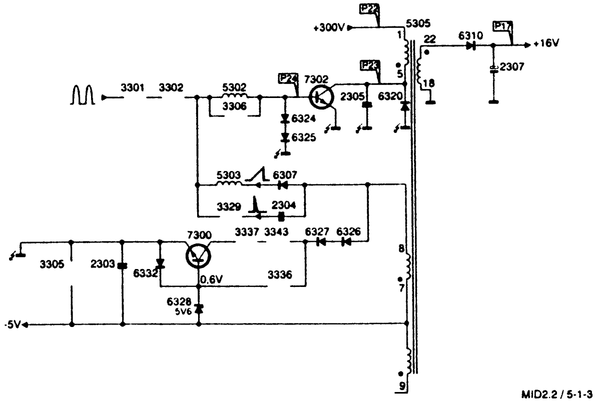

P22
+300V
5305
1
22
6310
P17
+16V
2307
18
P23
5
P24
7302
3301
3302
5302
3306
2305
6320
6324
6325
5303
6307
3329
2304
7300
3337
3343
6327
6326
8
3305
2303
6332
0.6V
3336
7
6328
5V6
-5V
9
MID2.2 / 5-1-3

Fig. 9.2

CONTROL, STANDBY, PROTECTION

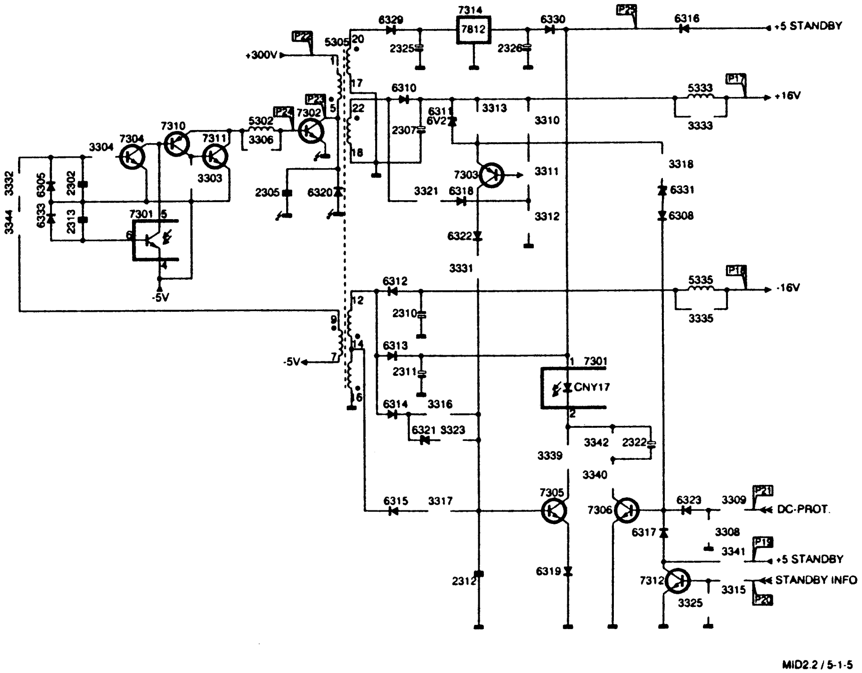
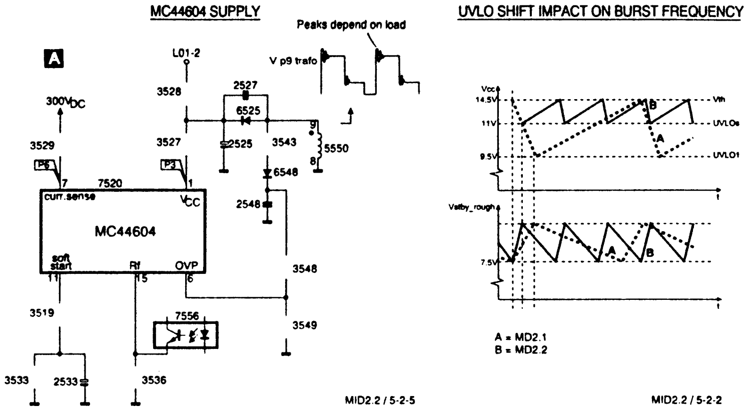

6329
7314
7812
6330
P25
6316
+5 STANDBY
P22
5305
20
+300V
2325
2326
1
17
6310
5333
P17
+16V
P23
22
6311
6V2
3313
3310
3333
P24
7302
5302
3306
5
2307
7310
7311
3304
7304
18
3303
3318
7303
3311
3332
6305
2302
2305
6320
3321
6318
6331
6308
3344
6333
2313
7301
5
6
3312
6322
4
-5V
3331
6312
5335
P18
-16V
12
2310
3335
9
6313
-5V
7
14
2311
1
7301
CNY17
6
6314
3316
2
6321
3323
3342
2322
3339
3340
6315
3317
7305
7306
6323
3309
P21
DC-PROT.
6317
3308
P19
3341
+5 STANDBY
2312
6319
7312
3315
STANDBY INFO
3325
P20
MID2.2 / 5-1-5

Fig. 9.3

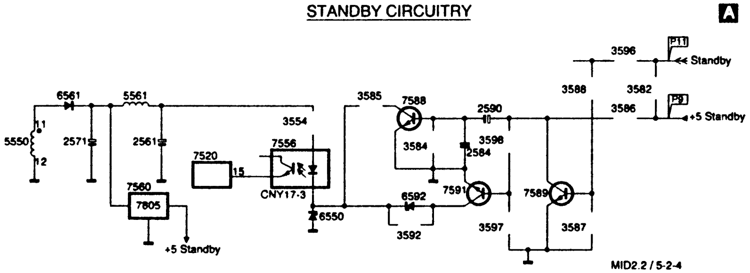


MC44604 SUPPLY

UVLO SHIFT IMPACT ON BURST FREQUENCY

A
Peaks depend on load
L01-2
V p9 trafo
3528
2527
300VDC
6525
3529
3527
2525
3543
5550
P6
P3
6548
7520
curr.sense
VCC
2548
MC44604
soft start
Rf
OVP
11
15
6
3548
3519
7556
3549
3533
2533
3536
MID2.2 / 5-2-5
Vcc
14.5V
11V
9.5V
Vth
UVLOs
UVLO1
B
A
Vstby_rough
7.5V
t
A = MD2.1
B = MD2.2
MID2.2 / 5-2-2

Fig. 9.4

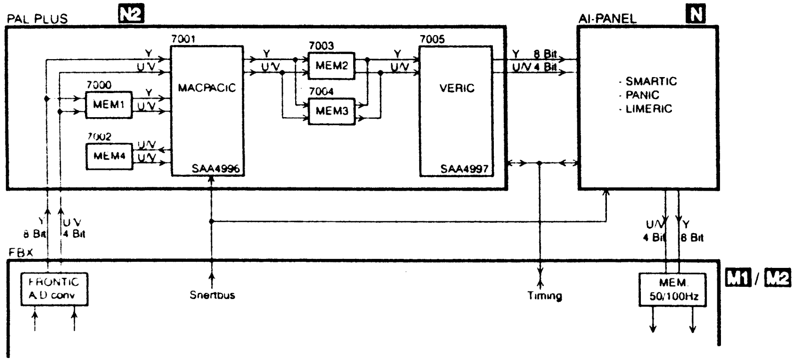


STANDBY CIRCUITRY

A
3596
P11
Standby
3588
3582
P9
+5 Standby
6561
5561
3585
7588
2590
3586
3554
5550
2571
2561
7556
3584
3598
2584
7520
15
CNY17-3
7560
7805
6592
7591
7589
6550
3592
3597
3587
+5 Standby
MID2.2 / 5-2-4

Fig. 9.5

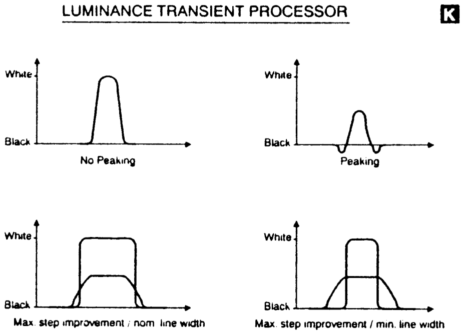
PAL plus


PAL PLUS
N2
AI-PANEL
N
7001
MACPACIC
SAA4996
7000
MEM1
7002
MEM4
7003
MEM2
7004
MEM3
7005
VERIC
SAA4997
Y 8 Bit
U/V 4 Bit
· SMARTIC
· PANIC
· LIMERIC
Y 8 Bit
U V 4 Bit
FBX
FRONTIC
A D conv
Snertbus
Timing
MEM
50/100Hz
U/V 4 Bit
Y 8 Bit
M1 / M2

MID2.2 / 8-2

Fig. 9.6

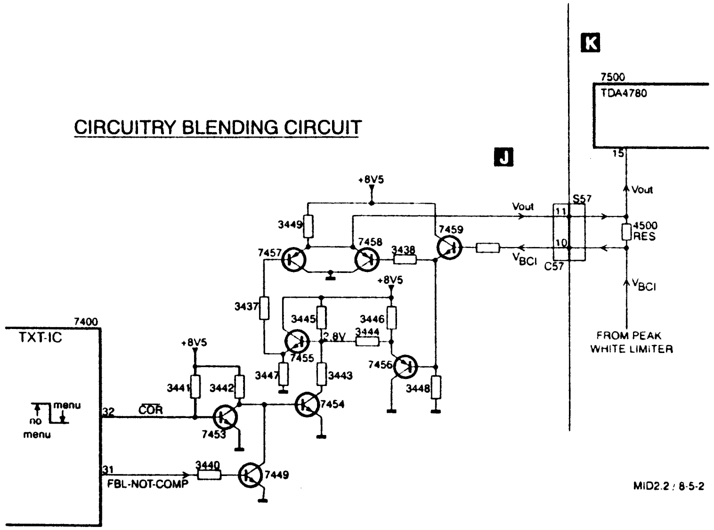
LUMINANCE TRANSIENT PROCESSOR



MID2.2 / 8-6-2

Fig. 9.7

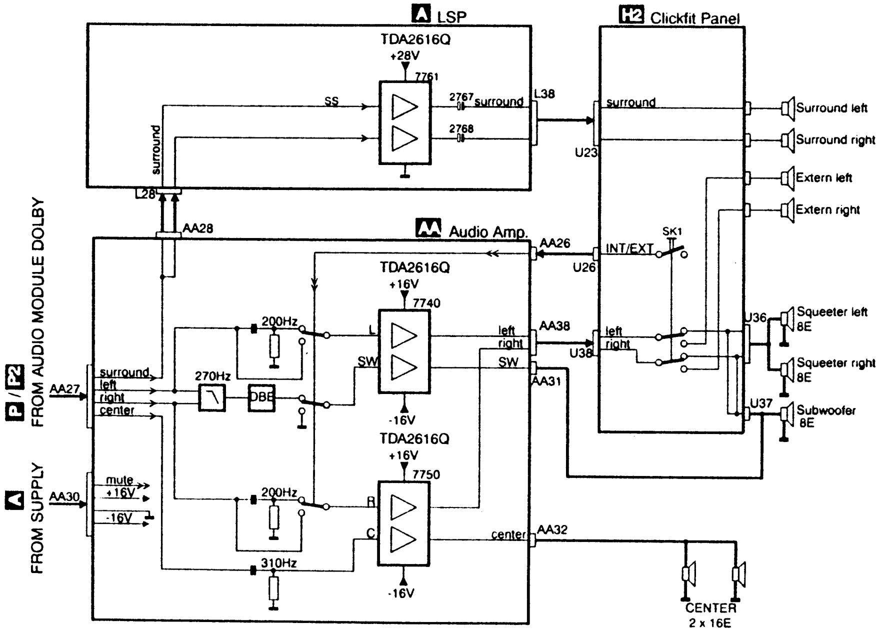
CIRCUITRY BLENDING CIRCUIT


K
7500
TDA4780
15
Vout
4500
RES
VBCI
FROM PEAK WHITE LIMITER
J
+8V5
Vout
S57
C57
11
10
VBCI
3449
7457
7458
3438
7459
+8V5
3437
3445
3446
3444
2.8V
7455
7456
3443
3448
3447
7454
+8V5
3441
3442
7453
7400
TXT-IC
menu
no menu
32
COR
31
FBL-NOT-COMP
3440
7449

MID2.2 / 8-5-2

Fig. 9.8

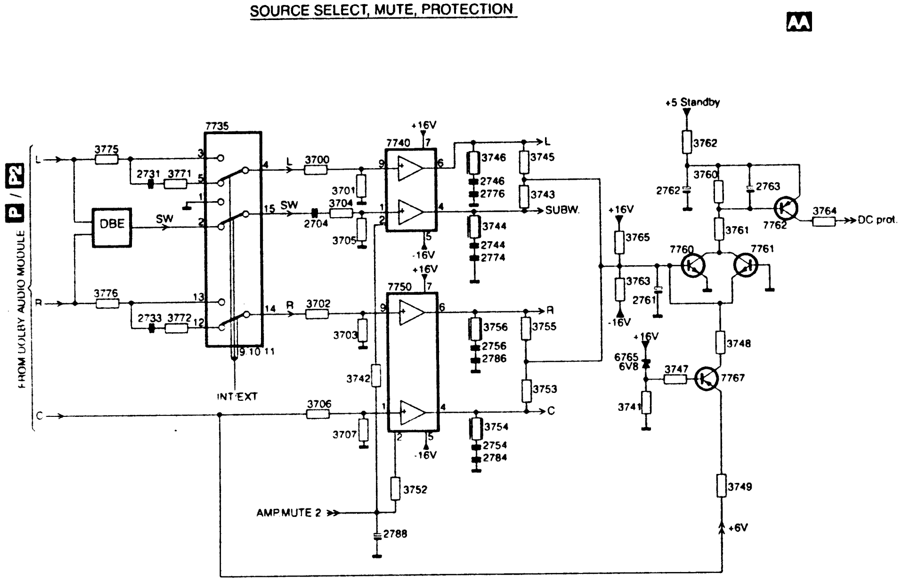
MD2.2 TOP DOLBY SUBWOOFER VERSION


A LSP
TDA2616Q
+28V
7761
SS
2767
surround
2768
L38
surround
L28
H2 Clickfit Panel
surround
U23
Surround left
Surround right
Extern left
Extern right
AA Audio Amp.
AA28
AA26
U26
INT/EXT
SK1
TDA2616Q
+16V
7740
200Hz
L
SW
-16V
left
right
SW
AA38
U38
left
right
U36
Squeeter left 8E
Squeeter right 8E
U37
Subwoofer 8E
AA31
270Hz
DBE
surround
left
right
center
AA27
P / P2 FROM AUDIO MODULE DOLBY
TDA2616Q
+16V
7750
200Hz
R
C
310Hz
-16V
center
AA32
CENTER 2 x 16E
A FROM SUPPLY
AA30
mute
+16V
-16V

MID2.2 / 9-1-1

Fig. 9.9

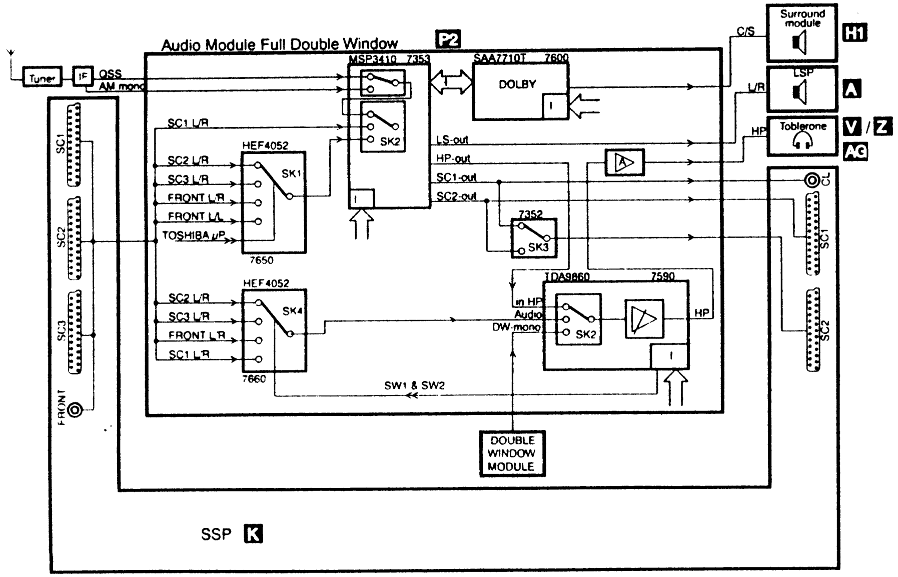
SOURCE SELECT, MUTE, PROTECTION


AA
P / P2
FROM DOLBY AUDIO MODULE
L
R
C
3775
2731
3771
DBE
SW
3776
2733
3772
7735
INT/EXT
3700
3704
2704
3701
3705
3702
3703
3706
3707
3742
+16V
7740
7750
-16V
3746
2746
2776
3745
3743
SUBW.
3744
2744
2774
3756
2756
2786
3755
3753
3754
2754
2784
3752
AMP MUTE 2
2788
+5 Standby
3762
3760
2762
2763
7762
3764
DC prot.
3761
7760
7761
3765
3763
2761
6765
6V8
3747
7767
3741
3748
3749
+6V

MID2.2 / 9-1-3

Fig. 9.10

BLOCK DIAGRAM AUDIO MODULE FULL DOUBLE WINDOW


Tuner
IF
QSS
AM mono
Audio Module Full Double Window
P2
MSP3410 7353
SAA7710T 7600
DOLBY
SK2
SC1 L/R
HEF4052
SC2 L/R
SC3 L/R
FRONT L/R
FRONT L/L
TOSHIBA µP
SK1
7650
LS-out
HP-out
SC1-out
SC2-out
7352
SK3
TDA9860 7590
in HP
Audio
DW-mono
HP
HEF4052
SK4
7660
SW1 & SW2
DOUBLE WINDOW MODULE
C/S
Surround module
H1
L/R
LSP
A
Toblerone
V / Z
AG
CL
SC1
SC2
SC3
FRONT
SSP
K

MID2 2 / 9 5

Fig. 9.11

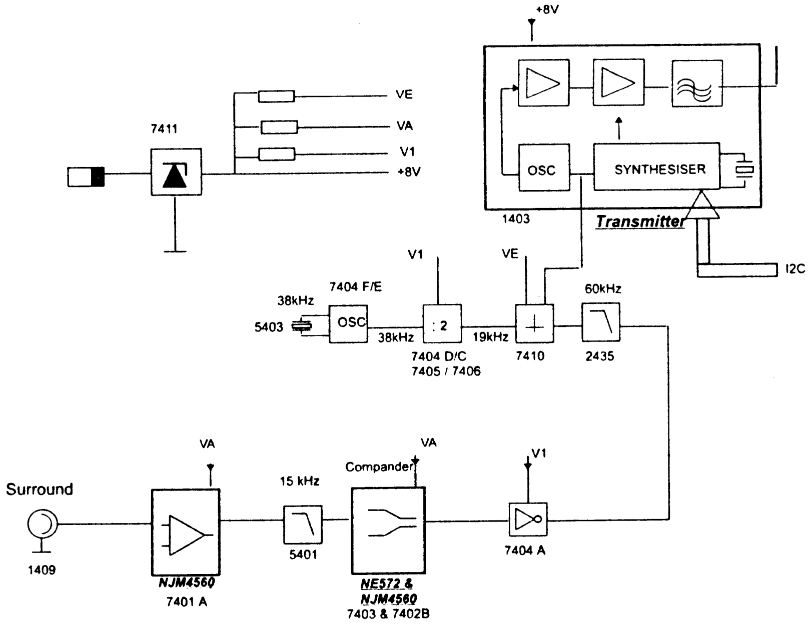

+8V
VE
VA
V1
+8V
7411
OSC
SYNTHESISER
1403
Transmitter
I2C
V1
VE
7404 F/E
38kHz
5403
OSC
38kHz
: 2
19kHz
7410
60kHz
2435
7404 D/C
7405 / 7406
VA
VA
V1
Surround
1409
15 kHz
Compander
5401
NJM4560
7401 A
NE572 &
NJM4560
7403 & 7402B
7404 A

Fig. 9.12

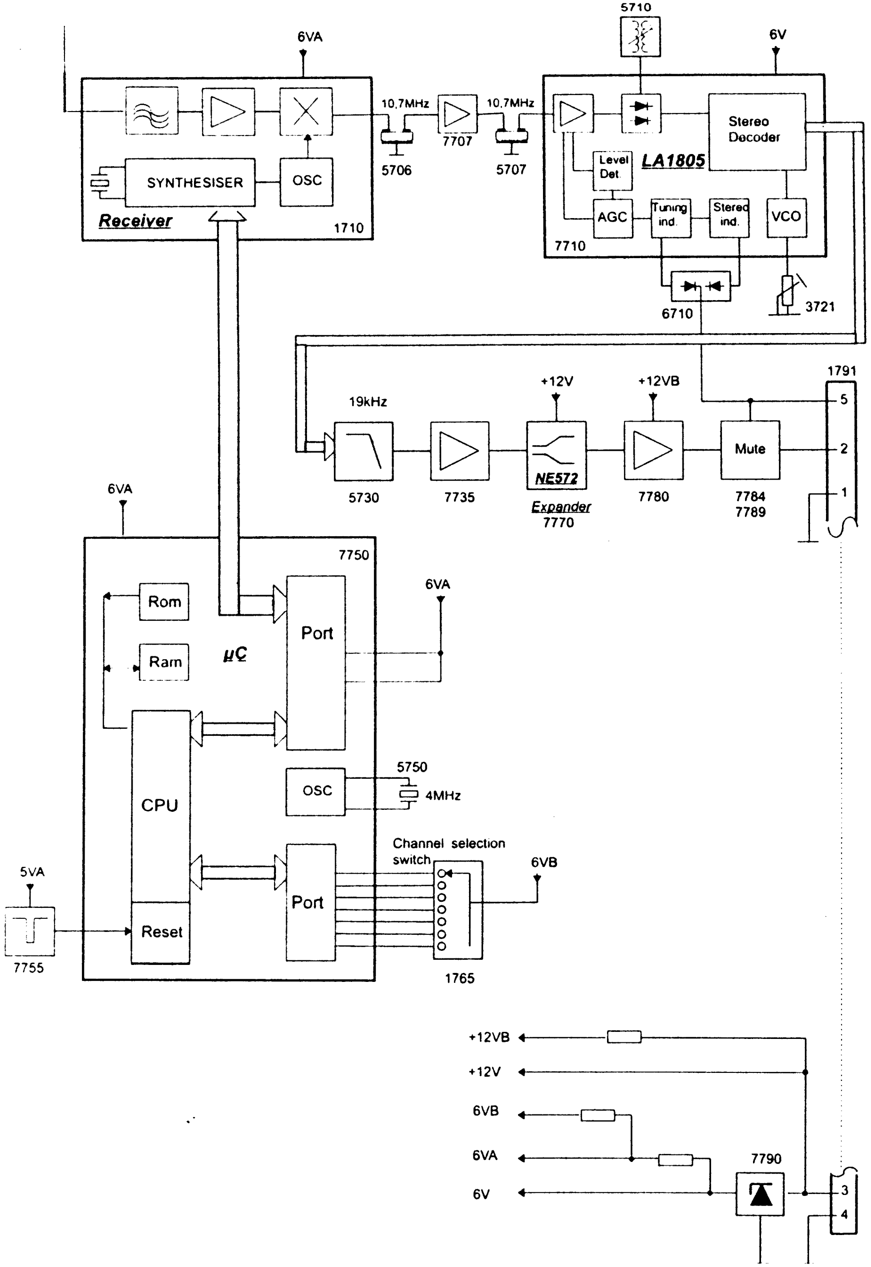
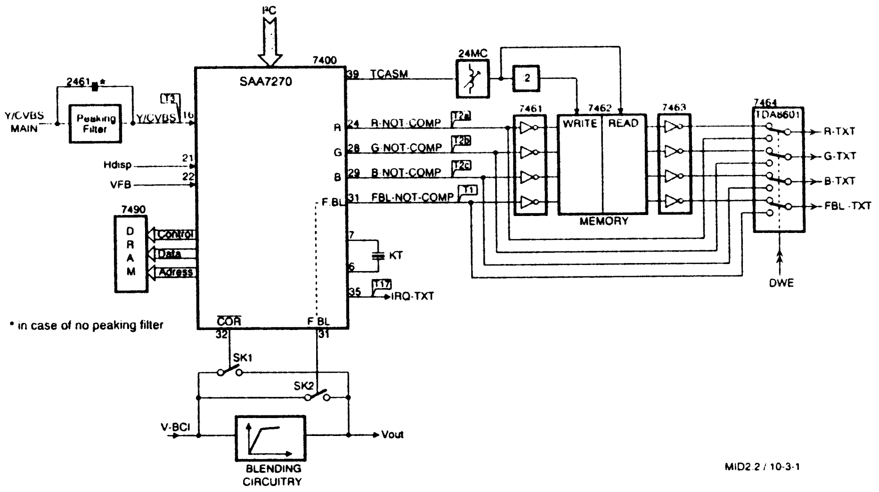

5710
6VA
6V
10,7MHz
10,7MHz
7707
5706
5707
Stereo Decoder
Level Det.
LA1805
AGC
Tuning ind.
Stereo ind.
VCO
7710
SYNTHESISER
OSC
Receiver
1710
6710
3721
1791
19kHz
+12V
+12VB
Mute
NE572
5730
7735
Expander
7770
7780
7784
7789
5
2
1
6VA
7750
Rom
Ram
µC
Port
6VA
CPU
OSC
5750
4MHz
5VA
Reset
Port
Channel selection switch
6VB
7755
1765
+12VB
+12V
6VB
6VA
6V
7790
3
4

Fig. 9.13

BLOCK DIAGRAM TELETEXT


J
I²C
7400
SAA7270
2461
Y/CVBS MAIN
Peaking Filter
Y/CVBS 16
T3
Hdisp 21
VFB 22
7490
D R A M
Control
Data
Adress
39 TCASM
24MC
2
R 24 R-NOT-COMP
G 28 G-NOT-COMP
B 29 B-NOT-COMP
F.BL 31 FBL-NOT-COMP
T2a
T2b
T2c
T1
7461
7462
7463
7464
TDA8601
WRITE
READ
MEMORY
R-TXT
G-TXT
B-TXT
FBL-TXT
DWE
7
6
KT
35 IRQ-TXT
T17
COR
F.BL
32
31
SK1
SK2
V-BCI
Vout
BLENDING CIRCUITRY
MID2.2 / 10-3-1

* in case of no peaking filter

Fig. 9.14

VIDEO PATH FOR VIDEO DUAL SCREEN

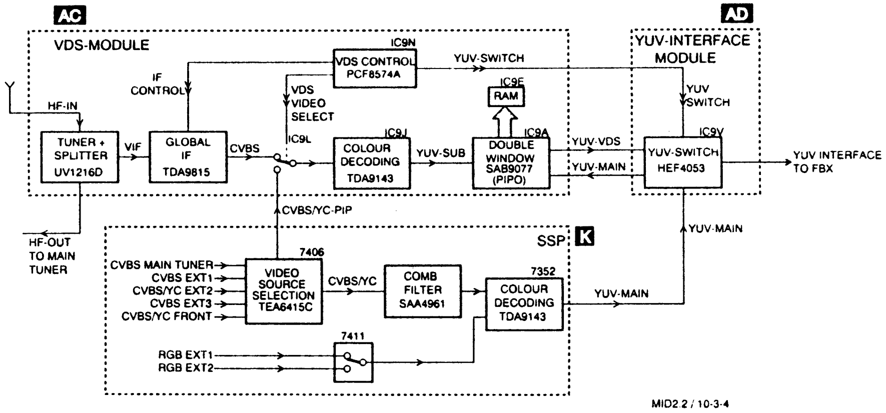

AC
VDS-MODULE
AD
YUV-INTERFACE MODULE
IC9N
VDS CONTROL PCF8574A
YUV-SWITCH
IF CONTROL
HF-IN
VDS VIDEO SELECT
IC9E
RAM
TUNER + SPLITTER UV1216D
VIF
GLOBAL IF TDA9815
CVBS
IC9L
IC9J
COLOUR DECODING TDA9143
YUV-SUB
IC9A
DOUBLE WINDOW SAB9077 (PIPO)
YUV-VDS
YUV-MAIN
YUV SWITCH
IC9V
YUV-SWITCH HEF4053
YUV INTERFACE TO FBX
HF-OUT TO MAIN TUNER
CVBS/YC-PIP
YUV-MAIN
SSP
K
7406
CVBS MAIN TUNER
CVBS EXT1
CVBS/YC EXT2
CVBS EXT3
CVBS/YC FRONT
VIDEO SOURCE SELECTION TEA6415C
CVBS/YC
COMB FILTER SAA4961
7352
COLOUR DECODING TDA9143
YUV-MAIN
7411
RGB EXT1
RGB EXT2
MID2.2 / 10-3-4

Fig. 9.15

PCS 93016 GB

Contents

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Installation 3
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  Select the menu language and country 4
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  Manual installation 5
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Reshuffle the programme list 6
Select favourite TV channels 6
Install TV setup 7
The keys on top of the TV 7

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  Sound menu 10
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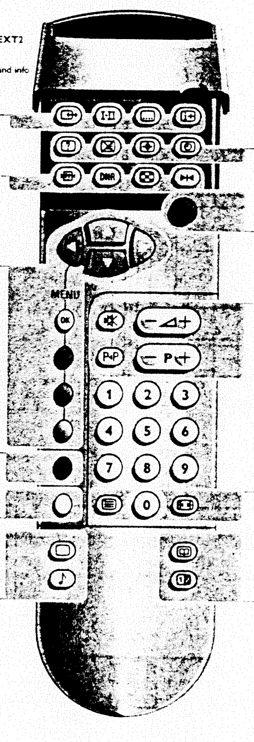
EasyLink features are based on the "one touch operation" approach. This means that a sequence of actions are executed at the same time in both the television and the video cassette recorder, ***provided both are fitted with the EasyLink function*** *and connected with the eurocable supplied.*

Your remote control



p. 17 selection of **EXT1**, **EXT2** or **FRONT**
p. 9 I-II bilingual choice + sound info
p. 9 continuous subtitles
p. 9 info on screen

p. 9 personal preferences
DNR reduce image noise
mosaic screen
freeze the picture

Menu
p. 3 select your choice
p. 3 activate your choice
p. 10 picture menu
p. 10 sound menu
p. 11 features menu

p. 8 programme list
p. 8 incredible surround on/off

p. 8 picture
♪ sound

Teletext
p. 14 solution to riddles
mix tv/txt picture - hold
enlarge
subpage selection / time display

p. 3 **Installation**

p. 8 switch to standby

p. 8 volume key
programme selection
temporarily switch sound off
P<P previous programme

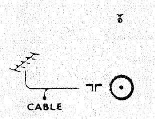
p. 13 teletext on/off
p. 8 picture format

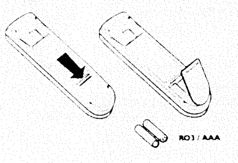
p. 8 programme guide on/off
for future use

Direction for use

MD 2.21/2.22/2.23 60

Preparation



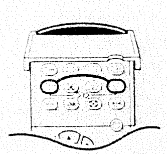


1. **Place the TV on a solid surface.** For ventilation, leave at least 5 cm free all around the TV. To prevent any unsafe situation, do not place any objects on top of the TV.
2. **Insert the aerial plug** tightly into the aerial socket ᚁ at the back of the TV. You can improve the picture quality by using the suppressor-aerial cable supplied.
3. Insert the mains plug in the wall socket with a mains voltage of 220V - 240V.
4. Remote control: Remove the cover of the battery compartment. Insert the 2 batteries supplied (type R03G-1.5V).

   The batteries supplied do not contain the heavy metals mercury and cadmium. Nevertheless in many countries exhausted batteries may not be disposed of with your household waste. Please ensure you dispose of exhausted batteries according to local regulations.
5. **Switch TV on** : Press the power switch ⓘ on the front of your TV. A green indicator and the screen light up. If the indicator is red, press the -P+ key on the remote control.

   The green lamp blinks every time you press a key on the remote control. When you switch on your set ***for the first time****, the menu* **LANGUAGE** *automatically appears on the screen. Alternatively the explanation appears in the different languages. Choose your own language and press the* **OK** *key on the remote control. Go on to page 4.*

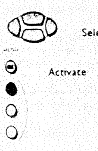
Installation



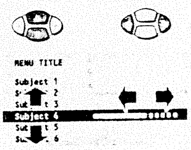
Select the INSTALLATION menu :

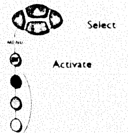
1. Open the door of the remote control.
2. Press ⍰ and ⏻ at the same time. After a short animation the menu pops up.

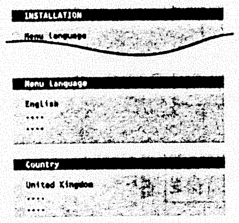
To use the menus



1. Use the ✥ keys to select a menu item.
2. Use the **OK** key to activate.
3. Use the red **MENU** key to return or to switch menu off.







Store TV channels

Select the menu language and country

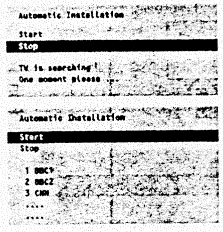
First, you have to select your language and your country.

1. Select the **Menu Language** and press the **OK** key.
2. Select your language and press the **OK** key.
3. Select **Country** and press the **OK** key.
4. Select the country where you are now located and press the **OK** key. Select **Other** when none of the countries applies.

You can now search for and store the TV channels in two different ways: using **automatic installation** or **manual installation** (tuning-in channel by channel).

- Select your choice and press the **OK** key.

If the TV is connected to a video recorder with the EasyLink function, the TV automatically transfers the language and country selections to the video recorder. The message ***EasyLink : Downloading ......*** *appears on the screen.*



Automatic installation

In the Automatic Installation menu select **Start** and press the **OK** key to activate the searching. All TV channels are searched for and stored automatically.

If a cable system which broadcasts ACI (Automatic Channel Installation) or a TV channel transmitting a teletext page with the frequencies and programme names of all the TV channels which can be received, is detected, the search is stopped and a programme list appears. The programme list is automatically filled with all the programme numbers and names of the TV channels transmitted.

It is possible that the cable company or the TV channel displays a broadcast selection menu. Layout and items are defined by the cable company or the TV channel. Make your choice with the ✥ *keys and press the* **OK** *key.*

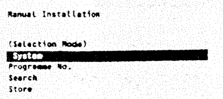
If the TV is connected to a video recorder with the EasyLink function, the TV automatically transfers the stored TV channels to the video recorder. The message ***EasyLink : Downloading Presets ...*** *appears on the screen. The programme list of the video recorder is now equal to the one of the TV.*

To exit from the menu

- Press the red **MENU** key.

Go on to page 6.

Manual installation



Searching for and storing TV channels is done channel by channel. You must go through every step of the Manual Installation menu.

Selection Mode is only present and lights up if the country you selected also offers the channel option (C-channels for aerial channels, S-channels for cable channels). You can choose either channel or frequency mode.

1. **Select the TV system**
   - Select the country or part of the world from where you want to receive the TV channel.
   - If you are connected to a cable system, select your country.
2. **Enter the programme number with the digit keys.**
3. **Search for a TV channel**

   The frequency or the channel number increases until a TV channel is found. In case of poor reception, you can improve the reception by adjusting the frequency with the -P+ key.

   Direct selection of a TV channel

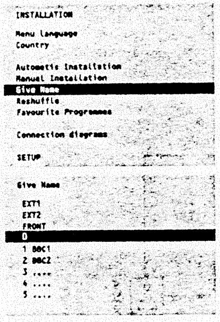
   If you know the frequency, or the C- or S-channel number, enter it directly with the digit keys 0 to 9. Ask for a list from your cable company or dealer, alternatively consult the Table of frequencies on the inside backcover of this handbook.
4. **Store steps ❶ till ❸**
   - Select **Store** and press the **OK** key.

After the new or extra TV channel has been stored, the TV automatically transfers that (those) TV channel(s) to the video recorder provided with the EasyLink function. The message ***EasyLink : Downloading Presets ...*** *appears on the screen. The programme list of the video recorder is now equal to the one of the TV.*

Repeat every step to store another TV channel.

To exit from the menu :

- Press the red **MENU** key.

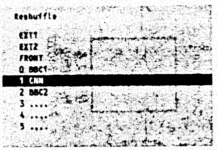


Give name

It is possible to change the name stored in the memory or to assign a name to a TV channel which has not yet been entered. A name with up to 5 letters or numbers can be given to the programme numbers 0 to 99. For example SUPER, BBC1,... Between 99 and 0 you can also name any peripherals that are connected.

1. Select **Give Name** in the **INSTALLATION** menu and press the **OK** key.
2. Select the programme number.
3. Press the **OK** key.
4. Select the character with the ⊕ ⊖ keys.
5. Select the following position with the ◁ ▷ keys.
6. Select the following character.
7. Press the **OK** key when finished.
8. Press the red **MENU** key to return to the **INSTALLATION** menu.

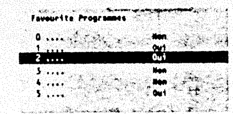
   A space, numbers or other special characters are located between Z and A.



Reshuffle the programme list

According to your preference you can change the order of the stored TV channels.

1. Select **Reshuffle** in the **INSTALLATION** menu and press the **OK** key.
2. Select the programme number you want to change.
3. Press the **OK** key.
4. Select the new number.
5. Press the **OK** key. Repeat the operation until all TV channels are allocated as you like.
6. Press the red **MENU** key to return to the **INSTALLATION** menu.

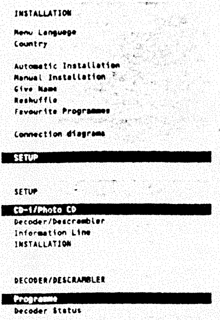


Select Favourite TV channels

After leaving the installation you can browse through the TV channels by pressing the -P+ key. Only those TV channels which are in the favourite list will be displayed. The non-favourite TV channels can still be selected with the digit keys.

1. Select **Favourite Programmes** in the **INSTALLATION** menu and press the **OK** key.
2. Select your favourite programme number.
3. Select **Yes** or **No**.
4. Repeat for every TV channel you want to change into a favourite or a non-favourite TV channel.
5. Press the red **MENU** key to return to the **INSTALLATION** menu.

If the TV is connected to a video recorder with the EasyLink function, the TV automatically transfers the reshuffled or modified TV channels to the video recorder. The message ***EasyLink : Downloading Presets ...*** *appears on the screen. The programme list of the video recorder is equal again to the one of the TV.*



INSTALLATION

Menu Language
Country

Automatic Installation
Manual Installation
Give Name
Reshuffle
Favourite Programmes

Connection diagrams

SETUP

SETUP

CD-i/Photo CD
Decoder/Descrambler
Information Line
INSTALLATION

DECODER/DESCRAMBLER

Programme
Decoder Status

Connection diagrams

See Connect Peripheral Equipment, p. 15

Install TV Setup

❶ Use the keys to select the menu item.

❷ Use the **OK** key to activate.

❸ Use the red **MENU** key to return or switch menu off.

CD-i / Photo CD

See Connect Peripheral Equipment, TV and a CD-i / Photo CD, p. 16.

Define Decoder/Descrambler programme numbers

If you have connected a decoder or a descrambler, see p. 15, you can define one or more programme numbers as decoder programme numbers.

- Press the ⊙ ⊙ keys to select **Off**, **EXT1** or **EXT2**, the euroconnector where you connected your decoder.
- Select **Off** if you do not want the selected programme number being activated as a decoder programme number.

*Select **EXT2** when the decoder is connected to your EasyLink video recorder. When selecting the decoder, the message **EasyLink: Downloading Presets....** appears on the screen.*

Information Line

After the selection of a TV programme or after pressing the [i+] key on the remote control, a TV channel which broadcasts teletext may transmit the name of the TV channel or the programme name or another message which appears briefly in the information line on the screen.
When selected **Off**, the information line will only appear after pressing the [i+] key, and not after the selection of a TV channel.

Installation

Select **Installation** and press the **OK** key to return immediately to the **INSTALLATION** menu.

To exit from the menu

❹ Keep the red **MENU** key pressed.

The keys on top of the TV

Should your remote control be lost or broken you can still change some of the basic picture and sound settings with the keys on top of the TV.

- Press the **MENU** key repeatedly to select **Volume**, **Brightness**, **Colour**, **Contrast**, **Treble** or **Bass**.
- Press the - or + key to regulate the selected adjustment.
  When the menu adjustment is not displayed, the - and + keys enable you to select the TV channels.

The selected adjustment automatically switches off when after 10 sec. no action has been executed.

Use of the remote control

⏻ Standby

The TV set is switched off and the red indicator lights up.
To switch the TV on again, press (-P+) or the digit keys.

Your TV consumes energy in the standby mode. Energy consumption contributes to air and water pollution. We advise to switch off your TV overnight instead of leaving it on standby. You save energy.

🔇 Mute key

Temporarily interrupt the sound or restore it.

P◂P Previous programme

The previously selected TV channel is displayed.
The -/-- indication has a video recorder function.

■ ○ Programme list

To select the programme list.
Select the desired TV channel with the ⊙ or ⊙ keys and press **OK**.
Programme numbers from the favourite list are displayed in white characters.
Programme numbers which are not in the favourite list are displayed in black. The current TV channel on the screen is indicated with a black block.

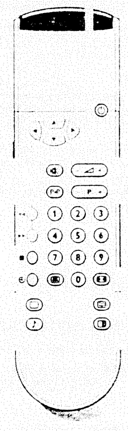
○ Incredible Surround

In **MONO** sound mode, this feature, when switched on, enables you to hear a spatial effect of sound.
In **STEREO** sound mode, when **Incredible Surround On** is selected, it seems as though the loudspeakers are spread further apart from one another.

▢ ♪ Smart Controls keys

To select predefined picture and sound settings.

Smart Picture (▢ key)
Each time it is pressed, a different picture setting is selected, corresponding with a specific predefined setting of Contrast, Colour, Sharpness and Contrast Plus.
Smart Sound (♪ key)
Each time it is pressed a different sound setting is selected, corresponding with a specific predefined setting of Treble, Bass and Loudness.
Personal refers to the personal preference setting of picture and sound which you have stored with **Store PP** in the Features menu, p. 11.
The smart picture and sound settings are set to **Manual** until the personal adjustments are stored.



(-◢+) Volume

The volume is adjusted. If you want to store the volume adjustment in the memory, see the Features menu, Store PP, p. 11 to store the same volume adjustment for all the stored TV channels.

(-P+) Programme selection

To browse through the TV channels activated in the Favourite Programme menu. See p. 6.

0 / 9 Digit keys

To select a TV channel.
For a two digit programme number, enter the second digit within 2 seconds.

Picture format

Press this key to switch to a wide screen format. A black bar appears at the top and the bottom of the screen.

The TV has an automatic switching function. Video recorders or programmes carrying special signals will automatically switch the TV to the correct screen format.

[12] For future use

Programme Guide

TV channels which broadcast teletext also transmit a page with the programme guide of the day. For each TV channel you can store the programme guide page which can be selected directly with the key.

- Press to switch on teletext and select the proper programme guide page.
- Press for 2 seconds to store the selected page.
- Press again to switch off teletext.

Every time you press the key, the programme guide page of the selected TV channel will be available. Press ⊙ ⊙ or the (-P+) key to run through the previous or the following pages and subpages. Press the key again to switch the page off.
For every TV channel the programme guide page should be stored separately.

Select peripherals

Press this key repeatedly to select **EXT1**, **EXT2** or **FRONT**, according to where you connected your peripherals (see p. 17).

I-II Bilingual choice and sound mode selection

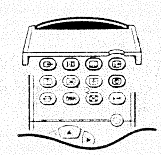
Press this key
- to switch from **Stereo** to **Mono** sound, in case of stereo transmission, or from **Digital Sound** to **Digital Sound available**, in case of digital transmission;
- to choose between language I (Dual I) or language II (Dual II), in case of bilingual transmission.

The setting is stored for each TV channel separately.

Time display

The time, downloaded from the TV channel (with teletext) stored on programme number 1 or under the lowest favourite programme number, is displayed on the screen.

This function is not available when continuous subtitles have been switched on.



Continuous subtitles

TV channels with teletext often transmit certain programmes with subtitling.
Switch on teletext and select the proper subtitle page from the index.
Press to store the subtitle page.
Switch off teletext.
Every time a programme of the selected TV channel is subtitled, the subtitling will be available **for that TV channel**.
Press to switch the subtitles **On** of **Off**.
When switched on and only the subtitle symbol appears, there are no subtitles available for that programme.

[i+] Permanent programme number Screen information

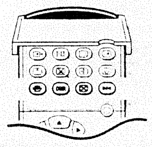
Press for 5 seconds to activate/de-activate the continuous display of the programme number.
Press briefly to display information about the selected TV channel and programme, the sound reception, the selected DNR setting and picture format and the remaining time set with the sleeptimer.

PP Personal Preferences

Restore picture and sound settings, stored in the features menu (see p. 11).

DNR Dyn. Noise Reduction

To reduce the image noise and improve picture quality when receiving weak signals.
Press this key to select **Minimum**, **Medium** (optimum picture quality for normal strength signal), **Maximum** (for poor picture quality) or **Off**.
DNR can be individually set for each TV channel.



Mosaic screen

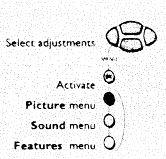
A menu line **MOSAIC** appears.
Select the desired function with the ⊙ ⊙ keys and press the **OK** key.
Scan: a scan of the TV channels placed in the favourite list is performed. On the last position, a live picture of the actual programme is shown.
Press the **OK** key again to have the continuation of the list.
Photo Finish: the main picture is displayed in successive frozen pictures.
Press the **OK** key again to have a new sequence of frozen pictures.
Strobe: the picture is reproduced image by image.
Press the **OK** key again to have a faster speed.

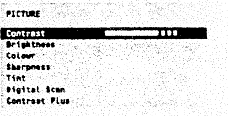
Press to switch off the mosaic screen.

Never perform a scan while recording a TV programme with a video recorder recording from EXTERNAL 1 or 2, since the scan will be recorded on tape.

▶◀ Freeze

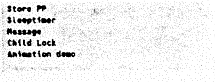
To activate/de-activate the frozen picture.





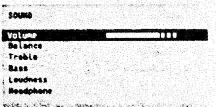
PICTURE

Contrast
Brightness
Colour
Sharpness
Tint
Digital Scan
Contrast Plus



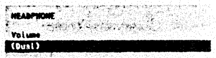
FEATURES

Store PP
Sleeptimer
Message
Child Lock
Animation demo



SOUND

Volume
Balance
Treble
Bass
Loudness
Headphone



HEADPHONE

Volume
(Dual)

Use of the menus

❶ Press the red, green or yellow colour key to display/cancel the **PICTURE**, **SOUND** or **FEATURES** menu.
Each time a menu opens a short animation will introduce the menu.

❷ Use the keys to select the menu item.

❸ Use the **OK** key to activate.

Picture menu

When you are watching a TV channel in the NTSC system, or if a NTSC peripheral is connected to one of the euroconnectors, the option Hue also appears and can be adjusted.

Sharpness

You can adjust the Sharpness for each TV channel separately.

Tint

- Select the colour temperature: **Normal**, **Warm** or **Cool**.

Digital Scan (Line Flicker Reduction)

In certain circumstances while watching TV programmes it may be preferred to switch off the digital scan line flicker reduction.

- Press the ⊙ ⊙ keys to select **On** or **Off**.

Contrast Plus

To make the contrast between darker and brighter picture parts more noticeable switch the Contrast Plus function on.
In certain circumstances it may be preferred to switch Contrast Plus off.

- Store the modified adjustments for Contrast, Brightness, Colour, Tint, Digital Scan and Contrast Plus for all TV channels with **Store PP** in the **FEATURES** menu.

Sound menu

Switch Loudness on or off

When Loudness On is selected, the low and high frequencies are amplified so that the natural balance is restored when listening at a low volume.
The selected setting for Loudness is stored for all TV channels.

Headphone

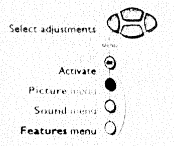
See Connect Peripheral Equipment, p. 16 for the connection of the headphone.

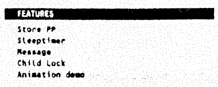
- Select **Dual** to choose between the dubbed or original language when the TV channel broadcasts in 2 languages.

- Store the modified adjustments for Volume, Balance, Treble and Bass for all TV channels with **Store PP** in the **FEATURES** menu.

To exit from the menus

- Press the corresponding red, green or yellow colour key.





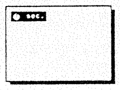
FEATURES
Store PP
Sleeptimer
Message
Child Lock
Animation demo

Features menu

- ➊ Press the yellow colour key to display/cancel the **FEATURES** menu.
- ➋ Use the ◁▷△▽ keys to select the menu item.
- ➌ Use the **OK** key to activate.

Store PP

The adjustments of Contrast, Brightness, Colour, Tint, Digital Scan and Contrast Plus made in the picture menu and the adjustments of Volume, Balance, Treble, Bass and Loudness made in the sound menu can be stored in memory for all the TV channels.



Sleeptimer

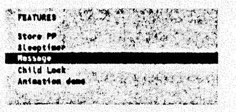
With the sleeptimer you can set a time period after which the TV should switch itself off to standby.
The counter runs from **Off** up to **180 min.** or from **180 min.** down to **Off**.
One minute before the TV is set to go to standby, the remaining minute appears on screen. You can always switch off your set earlier or change the set time.

Child Lock

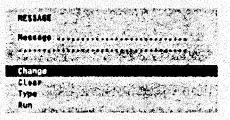
If the child lock is on, the TV can only be switched on with the remote control. The - and + keys on top of the TV cannot be used to select a TV channel. In this way you can prevent unauthorised use of your TV.
If the message **Child Lock On** appears, the child lock must be switched off before you can use the - and + keys on the TV to select a TV channel.

Animation demo

Selecting this menu item starts a continuous loop of an animation introducing your TV. This animation has no operational function.
Press the **OK** key to stop the animation.



FEATURES
Store PP
Sleeptimer
Message
Child Lock
Animation demo



MESSAGE
Message ....
....
Change
Clear
Type
Run

Message

With this function you can enter a personal message on 2 lines which will be displayed automatically when the set is switched on from standby.
For example: I'll be late this evening. Don't wait for dinner.

Change

- Select with the △ ▽ keys the letter or number you want to enter.
- Select with the ▷ key the next position.
- Press the **OK** key when you have entered the complete message.

Clear

- Press the **OK** key to remove a previous message.

Type

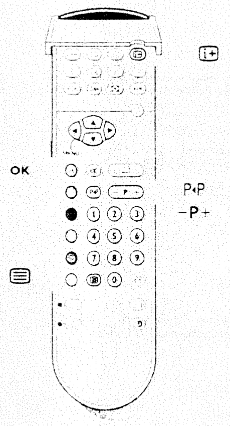
- Press the ◁ ▷ keys to select the way the message will be displayed : **Wipe**, **Slide**, **Fall** or **Fade**.
  The Fade display is a randomly selection of the three other display types.

Run

- Press the ◁ ▷ keys to select the display frequency : **Continuous**, **Once** or **No**.

Display message

- Switch the TV to standby.
  The message appears on the screen when the TV is switched on again.
  If you selected **Once**, the message will disappear from the screen after 30 seconds.
  If you selected **Continuous**, the message will appear on the screen until the display frequency is switched off in the Message menu.
  The message does NOT appear when Continuous Subtitles have been switched **On**. See p. 9.



Teletext

Most TV channels broadcast information via teletext. Each channel which broadcasts teletext transmits a page with information on how to use its teletext system. Look for the teletext page with the main index (usually p. 100).

Depending on the TV channel, teletext is transmitted in different systems.
The colours used in the options line correspond with the colour keys of your remote control.

About the Easy Text system

The Easy Text system considerably reduces the waiting time (on condition the teletext broadcast of the particular TV channel is switched on for at least half a minute) by :

- a **direct selection** of previous and following pages which are in transmission and of the pages referred to in the options line
- a **habit watcher list**: frequently used pages are put in a list of preferred pages, so that they are immediately available afterwards
- the **precapturing of the page numbers** referred to in the displayed page
- the **precapturing of all the subpages**.

Switch Teletext on and off

- Press ≣ to switch on or off the teletext.
  The main index page appears on the screen together with two information lines at the top and one option line at the bottom of the screen.

Select a Teletext page

With the digit keys

- Enter the desired page number with the digit keys.
  The page counter seeks the page or the page appears immediately when the page number has been stored in the memory.
  A message appears when you have entered a non existent or an incorrect page number. Page numbers beginning with 0 or 9 do not exist. Choose another number.

With the option line

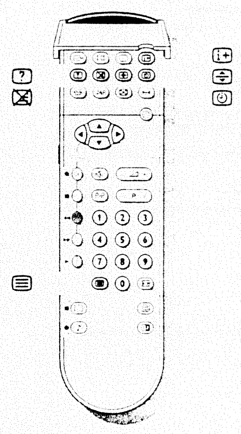
- Select with the colour keys, corresponding to the coloured options at the bottom of the screen, the desired subject.

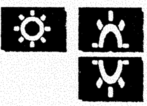
Quickly run through the teletext pages

- Press △ ▽ or the -P+ key to run through the previous or the following pages.

Select the previously selected txt page

- Press the P‹P key.





Select the index teletext page

- Press the white colour key to display the main index (usually p.100).

Only for T.O.P teletext broadcasts :

T.O.P orders the pages in categories and adds other possibilities of enhancing ease of use.

- Press i+. A T.O.P. overview of the teletext subjects available appears.
  Not all TV channels broadcast T.O.P. teletext. When the teletext system is not T.O.P. teletext, a message appears at the top of the screen.
- Select with the ◁▷△▽ keys the desired subject and press the **OK** key.

Select subpages

When a selected teletext page consists of different subpages, one of the subpages appears on the screen.
The coloured number in the first information line refers to the displayed subpage.
The other subpages can be selected in 2 ways :

1. With the ◁ ▷ keys.

The other subpage numbers appear in white as soon as the transmission has found them. They are stored in the memory so that they are available while the teletext page is on screen.

- Select with the ◁ ▷ keys the previous or the following subpage.

2. With the ⊙ key.

Enter the subpage number yourself.

- Press ⊙. Enter the desired subpage with the digit keys : e.g. 3 for the third page of seven subpages.
  The TV searches for the selected subpage.

Automatically rotating subpages:

- Press ⊙ again to cancel the entered digit for the subpage.
  Now the subpages rotate automatically.

- Press ⊙ again to select the subpages with the ◁ ▷ keys again.

Special teletext functions

Mix / Interrupt

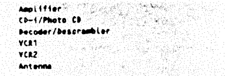
- Press ☒ to overlay the teletext page on the TV programme.
- Press ☒ again to de-activate the screen overlay.
  The display ≣ indicates that you are still in the teletext mode.
  You can select a page number. When the page has been found, the page number appears on the screen.
- Press ☒ again to display the teletext page.

Enlarge

- Press ⊞ repeatedly to display the upper part, the lower part and then to return to the normal page size. When the upper part is displayed, you can scroll the text line per line by using the △ ▽ keys.

Reveal

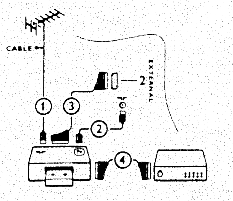
- Press ? to reveal/conceal the hidden informations, such as solutions to riddles and puzzles.



CONNECTION DIAGRAMS
Amplifier
CD-i/Photo CD
Decoder/Descrambler
VCR1
VCR2
Antenna

Connect Peripheral Equipment

There is a wide range of audio and video equipment that can be connected to your TV. The following connection diagrams show you how to connect it. See also the menu item Connection diagrams in the **INSTALLATION** menu where the different connection possibilities are shown. Each time a menu item is selected a graphic is shown of the connection. Those graphics have no operational function.



Video recorder

- Connect the aerial cables ①, ② and, to obtain a better picture quality, eurocable ③ as shown opposite.

*If your video recorder is provided with the EasyLink function, the eurocable supplied with it, should be connected to **EXTERNAL 2** to benefit from the EasyLink functionality.*

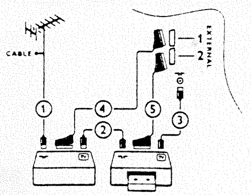
You have to do the following if you do not connect the eurocable ③.

Search for and store the test signal of the video recorder

- Unplug the aerial cable ① from the aerial socket ⊤ of your video recorder.
- Switch on your TV and put the video recorder on the test signal. (See the handbook for your video recorder.)
- Search for the test signal of your video recorder in the same way as you searched for and stored the TV signals. See Installation, Searching for and storing TV channels, Manual Installation, p. 5.
- Store the test signal either under programme number 0 or another number.
- Replace the aerial cable in the aerial socket ⊤ of your video recorder after you have stored the test signal.

Decoder and video recorder

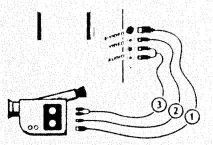
- Connect a eurocable ④ to your decoder and to the special euroconnector of your video recorder. See also the video recorder handbook.
  See Define Decoder/Descrambler prog. numbers, p. 7.
  You can also connect your decoder directly to **EXTERNAL 1** or **2** with a eurocable.



Video recorder and other peripherals (except CD-i/Photo CD)

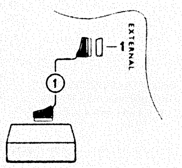
- Connect the aerial cables ①, ② and ③ as shown opposite. Better picture quality can be obtained if you also connect eurocable ⑤ to **EXTERNAL 2** and a eurocable ④ to **EXTERNAL 1**.
- Look for the test signal of your peripheral in the same way as you do for a video recorder.

When a video recorder is connected to **EXTERNAL 1** you can only record a programme from your TV.
Only when a video recorder is connected to **EXTERNAL 2** it is possible to record a programme from your TV as well as from other connected equipment. See Record with your video recorder, p. 18.



Camera and camcorder

- Connect your camera or camcorder at the right side of your TV.
- Connect the equipment to **VIDEO** ② and **AUDIO L** ③ for mono equipment.
- Press the I-II key under the door of the remote control repeatedly to select the sound coming from one or both loudspeakers of your TV.
- For stereo equipment, also connect **AUDIO R** ③.
  S-VHS quality with a S-VHS camcorder is obtained by connecting the S-VHS cables with the **S-VHS** input ① and **AUDIO** inputs ③.

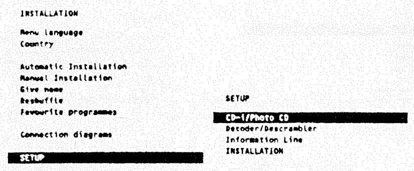


Other equipments

Connect the eurocable ① to **EXTERNAL 1** as shown opposite.

Only for CD-i and Photo CD :

- Press ▢ and ▢ at the same time.



INSTALLATION

Menu language
Country

Automatic Installation
Manual Installation
Give name
Reshuffle
Favourite programmes

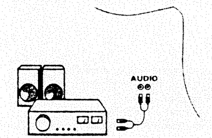
Connection diagrams

SETUP

SETUP

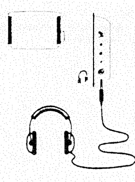
CD-i/Photo CD
Decoder/Descrambler
Information Line
INSTALLATION

- Select **CD-i/Photo CD Present** in the Setup menu of the **INSTALLATION** menu.
  This offers you optimum picture quality for your CD-i or Photo CD.
- Keep the red **MENU** key pressed to switch off all menus.



Audio equipment / Amplifier

- Connect the audio cables to the audio input of your audio equipment and to **AUDIO L** and **R** at the back of your TV.
  You can listen to your TV sound via your audio equipment.

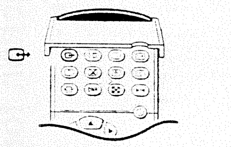


Headphone

- Insert the plug into the headphone socket 🎧 at the right side of the TV.
- Press 🔇 on the remote control to switch off the internal loudspeakers of the TV.
  The headphone impedance must be between 8 and 4000 Ohm. The headphone socket has a 3.5 mm jack.

In the **SOUND** menu select **Headphone** to adjust the headphone volume and to select dubbed or original language (when the TV channel broadcasts in two languages) for your headphone sound. See p. 10.

If you want to connect more equipment to your TV, consult your dealer.



To select connected equipment

If the TV is connected to a video recorder with the EasyLink function, in some cases the TV will be switched on, even when the TV was in standby. (E.g. playback tape...) This is not possible when Child Lock On is selected.

Equipment connected with an aerial cable only :

- Select the programme number under which you have stored the test signal with the digit keys.

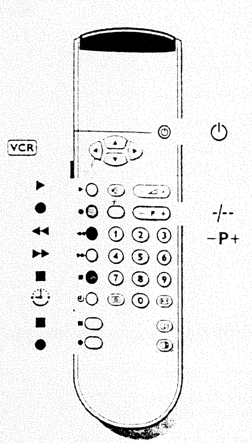
Equipment connected to a euroconnector or to the right side of the TV

- Press the ⊕ key repeatedly to select **EXT1**, **EXT2** or **FRONT**, according to where you connected your equipment at the back or the right side of your TV.

Remark : Most equipment (decoder, video recorder) comes this switching itself.

Do you want to watch TV channels again ?

- Enter the programme number of the TV channel which you want to watch with the digit keys.



Video recorder keys

Most of the video equipment from our range of products can be operated with the remote control of the TV.

Press simultaneously on the **VCR** key and:

▶ ○ for play.
● ○ for record.
◀◀ ○ for rewind.
▶▶ ○ for fast forward.
■ ○ for stop.
⏲ ○ for programming (on certain models).
-/-- for selecting 1- or 2- digit programme numbers from the video recorder tuner.
−P+ for fast programme selection from the video recorder tuner.
0 to 9 to select a programme number from your video recorder tuner.
⏻ to switch the video recorder to standby

These keys function with video recorders which use the RC5 signalling standard.

If your video recorder has the EasyLink function the ■ ▢ and ● ♪ keys for record and stop can be operated in the TV mode.
When you press the ■ ▢ key for 3 seconds, the TV and the video recorder are switched to standby.

Record with your video recorder without EasyLink

To record S-VHS quality, connect a S-VHS peripheral directly to the video recorder.

1. Record a TV programme

using only an **aerial cable**

- Select the programme number on your video recorder.
- Set your video recorder to record.
  (See the handbook for your video recorder.)

Switching programme numbers on your TV does not disturb recording !

using a **eurocable** connected to the euroconnector **EXTERNAL 2**

With a video recorder connected to EXTERNAL 2 it is possible to record a programme from your TV as well as from other connected equipment.

- Select the programme number or external input on the TV.
- Select the right external on your video recorder.
- Set your video recorder to record.
  You record what you are watching on the screen.

Do not switch programme numbers or do not switch off your TV when you are recording.

using a **eurocable** connected to the euroconnector **EXTERNAL 1**

With a video recorder connected to EXTERNAL 1 you can only record a TV channel.

- Select the programme number on the TV.
- Set your video recorder to record.

Switching to a programme from a connected peripheral equipment does not disturb recording.

2. Record a programme on your video recorder connected to EXTERNAL 2 from Audio/Video equipment connected to EXTERNAL 1 or to the right side

- Switch on the equipment.
- Select the right external on your video recorder.
- Set your video recorder to record.
  You record what you are watching on the screen.

Do not switch programme numbers or do not switch off your TV when you are recording !

Record with a video recorder with EasyLink

If you have connected a S-VHS video recorder provided with the EasyLink function, you can record S-VHS quality from a S-VHS peripheral connected to the right side of the TV. (E.g. from a S-VHS camcorder.)

In TV mode it is possible to start a direct recording of the programme which is being displayed on the TV screen.

- *Press at the same time the **VCR** key on the left side and the ● ♪ key of the remote control.*
  The video recorder switches on when it was in standby and a message of what is being recorded appears at the bottom of the screen.
  The video recorder starts recording the programme that appears on the screen.
- *Press the ■ ▢ key to stop the recording.*

*When recording a programme from a peripheral connected to **EXTERNAL 1** or **FRONT**, you can not select another TV programme on the screen.*
To watch TV programmes again, press the programme number you want to select twice. Then the recording is stopped and your video recorder switches to standby.
*If you switch to standby during recording a programme from a peripheral connected to **EXTERNAL 1** or **FRONT**, the blinking red lamp on the front of your TV indicates that you are still recording. The blinking stops after the recording is finished.*

Tips

Care of the screen

Clean the TV with a slightly damp soft cloth. Do not use abrasive solvent as it can damage the TV screen.

Poor Picture

Have you selected the correct TV system? Is your TV or house aerial located too close to loudspeakers, non-earthed audio equipment or neon lights, etc.?
Mountains or high buildings can cause double pictures or ghost images. Sometimes you can improve the picture quality by changing the direction of the outside aerial.
Is the picture or teletext unrecognisable? Check if you have entered the correct frequency. See Installation, p. 5.
Are brightness and contrast out of adjustment? Press the ⊕ key.
Sometimes poor picture quality is possible when having activated a S-VHS camera or camcorder connected to the right side of your TV and another peripheral is connected to EXT1 or EXT2 at the same time. In this case switch off one of the other peripherals.

No picture

Is the aerial connected properly? Are the plugs tightly connected in the aerial socket? Is the aerial cable in good condition and does it have suitable plugs? Are the connection facilities to a possible second TV in good condition? If in doubt, consult your dealer.

Remote control

If your TV no longer responds to the remote control, the batteries may be dead.
You can still use the Menu key and the -/+ keys at the top of your TV.

Menu

Have you selected the wrong menu? Press the same key again to exit from the menu.

No solution

Switch your TV off and then on again.
Never attempt to repair a defective TV yourself.
Check with your dealer or call a TV technician.

End of life directives

Your new TV contains materials which can be recycled and reused.
At the end of life specialised companies can dismantle the discarded TV to concentrate the reusable materials and to minimise the amount of materials to be disposed of.
Please ensure you dispose of your old TV according to local regulations.

How to dispose of dead batteries ?

The batteries supplied do not contain the heavy metals mercury and cadmium. Nevertheless in many countries dead batteries may not be disposed of with your household waste. Please ensure you dispose of dead batteries according to local regulations.

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Lexicon

100 Hz

100 Hertz provides a superior solution to the problem of picture flicker which is particularly noticeable with larger screen sizes. In a conventional TV, the picture area is scanned 50 times a second (50 Hertz) – a frequency which is still detectable by the human eye in the form of a flickering picture. In 100 Hertz sets, the picture area is scanned at a rate of 100 times per second (100 Hertz). At this frequency, the eye cannot detect flicker, resulting in a clearer picture which is more relaxing to the eye.

Automatic Channel Installation (ACI)

Automatically installs all TV channels in the same order as offered by your cable company, provided of course that the data is transmitted. It also automatically includes programme number and programme name.
With ACI, channel installation is fully automatic, simple and fast.

Child Lock

Feature to prevent children from viewing unwanted channels.

Digital Scan

If you look at a television screen you will see small imperfections in the picture caused by line vibration. Digital Scan (an internal process) removes interline flicker. When combined with 100 Hz, you will see a totally stable image.

DNR

Digital Noise Reduction.
By encoding signals digitally in 100 Hz sets with Digital Scan it is possible to clean up picture noise. This is especially beneficial in poor signal areas and when viewing poor quality video tapes.

Easy Link

Digital 'intelligent' ESI bus-system between audio components in HiFi systems and between TV and VCR. (Scart connection required). Turns source selection and control into a one-button operation.

Easy Text

Teletext memory that automatically memorises Teletext pages and gives you instant access to them.

Euroconnector

A 21-pins connector system enabling you to simply connect various types of audio/video and computer equipment.

Incredible Surround

Feature to enrich the sound performance of your TV set or audio equipment. It enhances the stereo effect by giving the impression that the speakers are positioned much wider apart than they actually are.

Menu

On-screen display of functions and facilities in a well-organised survey, which you can select using your remote control.

NTSC

The broadcasting system used in the USA, Japan and parts of South America and Southeast-Asia.

Smart Picture and Sound Controls

Keys on the remote control to select predefined picture and sound settings.

Sleeptimer

Function with which you can set a time period after which the TV should switch itself off to standby.

Picture Freeze

TV mode which allows you to "freeze" a certain image in order to study a specific detail at ease, e.g. to make notes of certain programme information like phone numbers.

Teletext

See also Easy Text
WST: World Standard Teletext.
FLOF: Full Level one Features. System applied by the BBC, RVE.... that provides a fast access to the teletext pages.
TOP: Table of (Teletext) Pages. German system for an easy access to the teletext pages.

Tint (or Hue in NTSC)

TV-function to modify the general colour balance between cool and warm and to adjust it according to your personal preference.

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11. List of abbreviations

(including all signal names)

+5S=+5V2=+5V2FB	+5V supply voltage from the +5V panel to all other +5V2 circuits (+5V2FB direct to the Feature Box)
+5STANDBY	+5V supply voltage from the power supply to the I/O-processor, RC5 receiver, red LED and Audio Supply panel (this voltage is also present in standby)
+8S=+8V5	+8V5 supply voltage from the power supply to all +8V5 circuits at the Small Signal Panel and the Digital Deflection Panel; (+8V5-FRONT to the front toblerone panel)
+13D	+13V supply voltage from the LOT to the Picture Tube panel
+13VLOT	+13V supply voltage from the LOT to the frame output stage
+16V/-16V	+16V and -16V supply voltage coming from the Audio Supply panel to the output amplifiers on the Audio Amplifier panel
+25S	+25V supply voltage from the power supply to the +5V panel
+28S	+28V supply voltage from the power supply to the Satellite panel
+200D	+200V supply voltage from the LOT to the Picture Tube Panel
>32KHZ DETECT	Detection signal from IC7160 on the VGA interface indicating the presence of either a VGA ('low') or SVGA ('high') signal
µP	Microprocessor
130VLOT	130V supply voltage from the LOT to the DC-shift circuitry
150VLOT	150V supply voltage from the LOT to the DC-shift circuitry
-15VLOT	-15V supply voltage from the LOT to the Digital Deflection Panel and frame output stage
1FH	1 time the horizontal frequency (e.g. 50Hz)
2FH	2 times the horizontal frequency (e.g. 100Hz)
ACI	Automatic Cable Installation
ADBL	Adaptive Black Level
AI	Artificial Intelligence panel mounted as a sandwich on Feature Box
AFC	Automatic Fine Tuning signal from the IF-module to the I/O-processor
AGC	Automatic Gain Control from the IF-module to the tuner
AMP_MUTE1	Switching signal from the LSP to the audio amplifier on the LSP and the clickfit panel for muting in case of SOUND_ENABLE is 'low' or the 'ANTIPLOP' supply voltage is below 10V DC
AMP_MUTE2	Switching signal from the LSP to the audio amplifiers on the Audio Amplifier panel for muting in case of SOUND_ENABLE is 'low' or the 'ANTIPLOP' supply voltage is below 10V DC
ANTIPLOP	Supply voltage from the power supply (D6562) to AMP_MUTE1(D6754) and AMP_MUTE2 (D6756, D6757).
AQUADAG	Aquadag (earth) on the rear side of the picture tube to the LOT
AUD1_TERR_AM	Low frequent AM demodulated sound from the IF-module to the Audio Module
AUDIO_IN!	LF surround audio signal in the wireless master box from the receiver (wireless mode) or plug 1250 (wired mode) to the amplifier
AUDIO_L/R	Low frequent left/right audio signal on the (Dolby) Audio Module originating from the MSP3410 (IC7353) or from IC7660. The signal can go to: → in Video DualScreen sets to IC7590 (TDA9860) for sound control → in non dolby sets via I28 to the LSP and from there to the DBE-module. → in top control dolby sets via I27 and the clickfit panel to the LSP and from there to the DBE-module → in front control dolby sets via I27 to the audio amplifiers on the Audio Power Module
BANDWIDTH LIMITING	Switching signal on the CRT panel that reduces the picture definition and thus the power consumption in the RGB output ICs
BC_INFO	Beam current info from the Picture Tube Panel to the video controller IC7500 for automatic cut-off point stabilisation (via a red, a green and a blue measuring line)
BG/I/DK/LL'/M	Sound system BG/I/DK/LL' indicates frequency distance between sound and picture carriers (5.5 MHz for BG, 6.0 MHz for I, 6.5 MHz for DK and LL', 4.5 MHz for M)
BG/L	Switching signal on the IF-module derived from POS/NEG ('1' for systems BGIM, '0' for systems LL')
BRIDGE	Signal line coming from the S-correction circuit to increase to S-capacitance (by adding an additional S-capacitor in parallel to the normal S-capacitor)
C/CVBS_MAIN	Chrominance/CVBS signal from the video matrix IC7406 on the Small Signal Panel to the COMB filter or direct to the video processor IC7352
C/CVBS_COMB	Chrominance/CVBS signal from the COMB filter to the video processor IC7352
C/CVBS_PIP	Chrominance signal from the video matrix IC7406 on the Small Signal Panel to the PIP module
C_DAC	Centre sound output signal from the Dolby Audio Module to the Audio Amplifier (front control sets) or the Surround Sound Panel (top control sets)
C_FRONT_INPUT	Chrominance signal from the side input panel (toblerone) to the video matrix IC7406 on the Small Signal Panel directly, or in case of 24" VGA via the VGA Interface panel
C_SC2_INPUT	Chrominance signal from the Euroconnector 2 to the video matrix IC7406 on the Small Signal Panel
C_SC2_OUTPUT	Chrominance signal from the video matrix IC7406 on the Small Signal Panel to Euroconnector 2
CL	Constant Level output audio cinches
COMBFILTER	Y and C separation filter (for PAL and NTSC transmission)
CRT	Cathode Ray Tube
CSM	Customer Service Mode
CTI	Colour Transient Improvement
CVBS	Colour Video Blanking Synchronisation
CVBS_SAT	CVBS from satellite; source select between CVBS_TERR and CVBS_SAT on the I/O-part of the Small Signal Panel
CVBS_SC1_INPUT	CVBS signal from pin 20 Euroconnector 1 to the video matrix IC7406 on the Small Signal Panel
CVBS_SC3_INPUT	CVBS signal from pin 20 Euroconnector 3 to the video matrix IC7406 on the Small Signal Panel
CVBS_TERR	CVBS signal from antenna; signals flows from the IF-module to the I/O part of the Small Signal Panel

List of abbreviations

DC_PROT/STBY	Protection line (active high) that switches the audio amplifier in protection when either the supply voltage is too high or low or a DC-component is present at the outputs.
DBE	Dynamic Bass Enhancement
DDP	Digital Deflection Processor
DEGAUSS	Degaussing signal from the power supply to the degaussing coil
DNR	Dynamic Noise Reduction
DPHSYNC / DPVSYNC	Synchronisation signals for the left-side VDS picture (main picture) from the TDA914X on the SSP to the IC9A PIPO
DST	Dealer Service Tool
DW_MONO	Mono LF audio signal from the TDA9815 (coming from the 2nd tuner) on the Video DualScreen Module to the VDS Sound Controller on the Dolby Audio Module
DWE	Switching signal from the main microprocessor to enable ('low') or disable ('high') Text DualScreen (Double Window Enable)
ECO BENDIC	Back END IC of Feature Box 3 (digital scan) and Feature Box 4 (natural motion)
EEPROM	Electrical Erasable Programmable Read Only Memory
EHT	Extra High Tension
EHTINFO	Voltage related to the beam current coming from the line output stage derived from the AQUADAG to the Digital Deflection Processor and the video controller IC7500; If the beam current increases the EHTINFO signal decreases. If the beam current is too high, the EHTINFO is used for contrast reduction via the video controller and horizontal width and shift correction via the DDP.
EPG	Electronic Program Guide (commercial name NexTView)
EW_DRIVE	East-west drive signal from the digital deflection processor
EWD	East-west drive going back from the east/west stage to the Digital Deflection Panel
EWGATE(_DP)	East-west gate drive signal from the Digital Deflection Panel to the east-west output stage
EWPROT	East-west protection signal from the east/west circuitry (mainly caused by the line output stage, see paragraph 6.4.4)
EXT1/EXT2/EXT3	Euroconnector 1, Euroconnector 2 or (optional) Euroconnector 3
FASTDOWN	In case of an 'urgent alarm' (see chapter 6 protection) switches off the line output stage by opening the series switch ('1' is fast down)
FBL_NOT_COMP	Uncompressed (full width) fastblanking signal from teletext processor to IC7464
FBL_PIP	Fast blanking signal from PIP to the PIP-part of the video controller IC7500. Only in full TXT mode the FBL_PIP overrules FBL_TXT via signal line TXT_KILL to display PIP in full TXT
FBL_PRESENT	Status signal from the front input panel (toblerone) to the I/O-processor. This signal is 'low' in case the fast blanking (pin 16) of Euroconnector 1 or Euroconnector 2 is present; the software will now apply a horizontal shift (in case of horizontal shift the comb filter is disabled)
FBL_SC1_INPUT	Fast blanking signal from Euroconnector 1 via source select Euroconnector 1/Euroconnector 2 IC7411 to the video controller IC7500
FBL_SC2_INPUT	Fast blanking signal from Euroconnector 2 via source select Euroconnector 1/Euroconnector 2 IC7411 to the video controller IC7500
FBL_TXT	Fast blanking signal from TXT (TXT and OSD) to the TXT-part of the video controller IC7500. Depending on the status of the DWE signal, the FBL-TEXT signal from IC7464 maybe horizontally compressed for Text DualScreen display
FBL_VGA	Fast blanking signal for VGA generated by IC7180 on the VGA interface module. This signal is used to switch the video controller TDA4780 in the VGA input mode, to enable the H-OUT and V-OUT to the DDP and - in 24" VGA sets - to select the VGA sound input
FBLK	Switching signal from the microprocessor to the YUV-Interface to select Video DualScreen ('high') or normal picture mode ('low')
FBX	Feature Box (50 to 100Hz conversion)
FDS	Full DualScreen. Ability to display two video pictures of two different programmes next to each other as well as the ability to display a video picture on the left side and Teletext or NexTView information on the right side
FLOF	Full Level One Feature
FRONTIC	Front IC of Feature Box 3 (digital scan) and Feature Box 4 (natural motion); (DA converter and horizontal zoom possibility)
FRONT/EXT2	Switching signal for the sound between front or EXT2 (see table in diagram)
FRONT/EXT3	Switching signal for the sound between front or EXT3 (see table in diagram)
FRONT_DETECT	Switching signal indicating whether a video signal has been detected on the front input panel (toblerone) ('1' if front input panel has detected CVBS or Y/C)
FSUB/COMB_ON/OFF	Combination signal from TDA914X to Comb filter. The signal is a combination of a DC switching signal to enable ('high') or disable ('low') the COMB-filter and an AC sub-carrier
HA	Horizontal Acquisition from the video processor IC7352 to the Feature Box and the VDS Module
HD	Horizontal Drive signal from the Feature Box to the Digital Deflection Panel
HDISP	Horizontal display synchronisation pulse derived from the HFB to TXT and PIP
HDRIVE	Horizontal drive signal from the Digital Deflection Panel to the line output stage
HD_SYNC_POL	Detection signal which indicates whether the incoming horizontal sync-pulses are positive ('high') or negative ('low')
HEATER	Supply voltage for the tube heater
HFB	Horizontal flyback pulse from the line output stage to the Digital Deflection Panel and via a 'slicer' (D6302) to HDISP
H_PULSE	Horizontal flyback pulse to N/S-correction circuitry (for 29"); signal from pin 8 LOT and jumper 9431
H/V_FRONT	Horizontal / Vertical VGA pulses from the front VGA front input to the VGA interface module (in front control sets only)
H/V_OUT	Positive Horizontal / Vertical VGA pulses from the VGA interface to the Large Signal Panel. Missing pulses (common in some VGA standards) are reconstructed
H/V_PRES	Switching signal; 'high' in case Horizontal resp. vertical VGA pulses are detected
H/V_REAR	Horizontal / Vertical VGA pulses from the rear VGA input on the VGA interface panel (in top control sets only)
I/O_CONTR BUS	Bi-directional project 50 communication bus between pin 10 of Euroconnector 2 and I/O-processor
I^2C_3	I^2C-bus for Non Volatile Memory (NVM) of the main-processor
I^2C_F	I^2C-bus fast for teletext
I^2C_S	I^2C-bus slow for rest of the set
IF_SWITCH	Switching signal from the I/O-processor to the IF-module for switching the source selection in the IF (not used in MD2)
IR_LED	Drive signal for the service IR LED for communication with the Dealer Service Tool
INT/EXT	Switching signal controlled by the INT/EXT switch on the clickfit panel to the DBE panel or Audio Amplifier panel
IRQ_SAT	Interrupt input (optional) from satellite to the main-processor for sets with a satellite decoder
IRQ_TXT	Interrupt input from the TXT decoder to the main-processor (direct communication between main-processor and TXT because of large number of memory pages)
KEYBOARD	AD converter input from the keyboard. The voltage indicates which key is pressed
L/R_DBE	Left/right audio signal from the DBE module to the Large Signal Panel
L/R_VGA	Left/right audio signal from the rear audio input cinches to IC7230 on the VGA Interface in top control sets (24" VGA)
L'	Switching signal from the I/O-processor to the IF-module for switching to the L' standard (L' = '0') (also misused for positive/negative switching in BGLMDK sets)
LED	Control for ON and STANDBY LED's (0V = standby)
LIMERIC	LIne MEmory noise Reduction IC on AI (Artificial Intelligence) panel on Feature Box
LINEDEFL_CS	Signal line going to the S-correction circuit to increase the S-capacitance (by adding an additional S-capacitor in parallel to the normal S-capacitors)
LINEDEFL_LIN	Corrected line deflection signal from the DC-shift circuitry on the External DC-shift panel back to the line output stage
LSP	Large Signal Panel
LV+	Frame coil drive signal from the frame output stage
LV-	Frame coil sink signal to the N/S correction circuitry
M / M_TRAP	Switching signal for the IF circuit for switching to the M (in BGLM sets '1' = M) or I standard (in BGLL'I sets '1' = I) (M is used on the IF-Module, M_TRAP on the VDS Module)
MAIN_IS_ALIVE	Protection line by which the I/O-processor checks the main-processor and the +5V2
MAINS_IN	220 volt in
MELZONIC	Motion Estimation, Line flicker, ZOom, Noise reduction IC on Feature Box 4 only (also for Natural Motion)
MPIP	Multi PIP (only made in Feature Box, not in PIP); in MPIP HA and VA are switched off
MSP	Multi Sound Processor
MUTE	Mute signal on the wireless dolby master box which is 'high' in case no pilot is detected or carrier is not strong enough or in case master box μC decides for muting
NC	Not Connected
NEXTVIEW	NexTView is the commercial name for EPG (Electronic Program Guide)
NO NORDIC	Not used in set for Nordic countries
NVM	Non Volatile Memory
OSD	On Screen Display
P50	Project 50 (= Easylink); Serial bus for communication with other devices like VCR etc.
PANORAMA	Optional control signal from the I/O-processor for controlling a panorama circuit ('1' = panorama; 1FH only as in 2FH panorama is provided by the Feature Box)
PANIC	PANorama IC on AI (Artificial Intelligence) panel on Feature Box
PORP (POR_PHILIPS)	Power On Reset signal derived from the VDD2 to the main-processor ('0' in normal operation and POR from high to low)
PORT	Power On Reset signal from the power supply to the I/O-processor (in normal operation '0' and POR from high to low) (at pin 33 I/O processor this is inverted via TS7601)
POS/NEG	Switching signal from the I/O-processor to the IF-module for positive/negative modulation ('0' for systems BGLM, '1 for systems LL')
PROT	Protection signal from the Digital Deflection Panel to the main-processor. If this signal line becomes high (rising edge) the set is switched into standby and the standby LED starts flashing (at main-processor side after invertor active at falling edge)
PROZONIC	PROgressive scan ZOom and Noise reduction IC on Feature Box 3 (digital scan)
PTP	Picture Tube Panel
PWL_ADJUST	Peak White Limiter adjust signal from the video controller to the peak white limiter. This luminance signal is used to adjust the clamping level of the peak white limiter and can be adjusted in the Service Alignment Mode
RAM	Random Access Memory
RC5	RC5 signal from the remote control receiver to the I/O- and main-processor
REFERENCE	Reference voltage for the Digital Deflection Panel (for making a defined current source) derived from the VOS
RGB_NOT_COMP	Uncompressed (full width) red, green, and blue signal from teletext processor to IC7464
RGB_PIP	Red, green and blue signals from PIP to the video controller IC7500
RGB_SC1_INPUT	Red, green and blue input signals from Euroconnector 1 via source select Euroconnector 1 /Euroconnector 2 IC7411 to the video processor IC7352
RGB_SC2_INPUT	Red, green and blue input signals from Euroconnector 2 via source select Euroconnector 1 /Euroconnector 2 IC7411 to the video processor IC7352

List of abbreviations

B_SC2_INPUT	Only in case of a Project 50 set, this signal line has a double function; Blue input signal from Euroconnector 2 and C_SC2_OUTPUT chrominance signal from video matrix IC7406 to Euroconnector 2
RGB_SC_INPUT	Selected RGB (by IC7411) from Euroconnector 1 or Euroconnector 2 to the video processor IC7352
RGB_SCART1,2	Switches between the RGB of Euroconnector 1 and Euroconnector 2 ('0' = RGB Euroconnector 1)
RGB_TXT	Red, green and blue signals from TXT to the video controller IC7500. Depending on the status of the DWE signal, the RGB-TXT signals from IC7464 can be horizontally compressed for Text DualScreen display
RGB_VC	Red, green and blue signals from the video controller IC7500 to the CRT Panel
RGB_IO_FRONT	VGA RGB signals from the VGA front connector via the VGA Interface panel to the video controller on the SSP (in front control sets only; 28" VGA)
RGB_IO_REAR	VGA (colour) signals from the VGA rear connector via the VGA Interface panel to the video controller on the SSP (in top control sets only; 24" VGA)
ROM	Read Only Memory
S_DAC	Surround sound output signal from the Dolby Audio Module. In front control dolby sets the signal goes via the Audio Amplifier module to the audio amplifier on the LSP (IC7761). In top control dolby sets this signal goes to the Surround Sound Amplifier module.
SAM	Service Alignment Mode; software mode for alignments, options, etc. (see chapter 6)
SAW	Surface Acoustic Wave; high precision band pass filter
SC1FH	Sandcastle at 1FH from the video processor IC7352 to the delay line IC7358 (and YUV-interface)
SC2FH	Sandcastle at 2FH from the Digital Deflection Panel to the video controller IC7500
SC_PEAK	Switching signal from the main-processor to the teletext peaking filter for switching on/off ('1' is peaking filter active)
SCL_F	Clock line of the I^2C-bus fast (for TXT)
SCL_S	Clock line of the I^2C-bus slow
SDA_F	Data line of the I^2C-bus fast (for TXT)
SDA_S	Data line of the I^2C-bus slow
SDM	Service Default Mode; predefined mode for faultfinding (see chapter 6)
SELECT2	Switching signal from the I/O-processor to the (Dolby) Audio Module for the sound selection for the Euroconnector 2 output between main sound ('0') and in EXT2 mode tuner sound ('1')
SIF	Sound IF
SLOWDOWN	Signal from the I/O-processor to switch on/off the serial switch ('1' = slowdown)
SMARTIC	Subtitle Movement and ARtificial Intelligence IC on AI (Artificial Intelligence) panel on Feature Box
SMPS	Switched Mode Power Supply
SNDL/R_SC1_INPUT	Left/right sound from Euroconnector 1 to the MSP IC7353 on the (Dolby) Audio Module
SNDL/R_SC2_INPUT	Left/right sound from Euroconnector 2 to source select located as IC7407 on the I/O-part of the Small Signal Panel or as IC7650 on the Dolby Audio Module (to enable VDS sound)
SNDL/R_SC3_INPUT	Left/right sound from Euroconnector 3 to source select located as IC7407 on the I/O-part of the Small Signal Panel or as IC7650 on the Dolby Audio Module (to enable VDS sound)
SNDL/R_FRONT_ INPUT	Left/right sound from the front input panel (toblerone) to source select located as IC7407 on the I/O-part of the Small Signal Panel or as IC7650 on the Dolby Audio Module (to enable VDS sound). In case of 24" VGA the signal goes via the VGA Interface panel
SNDL/R_SC2/SC3/ FRONT	Left/right sound from Euroconnector 2 or Euroconnector 3 or front input panel to the MSP IC7353 on the (Dolby) Audio Module
SNDL/R_SC1_ OUTPUT	Left/right sound from the MSP IC7353 on the (Dolby) Audio Module to Euroconnector 1
SNDL/R_SC2_ OUTPUT	Left/right sound from the MSP IC7353 on the (Dolby) Audio Module to Euroconnector 2
SNDL/R_CL_ OUTPUT	Left/right sound from the MSP IC7353 on the (Dolby) Audio Module to the constant level output rear cinches
SNDL/R_HEADP_ OUTPUT	Left/right sound from the output headphone amplifier on Audio Module to the headphone plug
SOUND_ENABLE	Switching signal from the I/O-processor (not from headphone plug as 4317 is not present) to the Audio Amplifier module for muting the audio amplifier(s) via the AMP_MUTE1 and AMP_MUTE2 signals (low active)
SOUND_SUPPLY	+28V supply voltage from the power supply to the sound amplifiers on the Large Signal Panel
SOUND28V	+28V supply voltage from the power supply to the Surround Sound panel
SSP	Small Signal Panel
SPHSYNC / SPVSYNC	Synchronisation signals for the right-side VDS picture (sub-picture) from the TDA914X on the VDS Module to the IC9A PIPO
STANDBY	Switching signal from the I/O-processor to the power supply to switch the set in and out standby ('0' = standby)
STBY_COM!	Switching signal in the wireless dolby master box ('low' for standby mode)
STATUS1/2/3	Status signal from Euroconnector 1 or 2 or 3 to the I/O-processor (0-1.28V no signal, 1.29-3.31V is 16:9 signal, 3.32-5.0V is 4:3 signal)
STBY	Standby
STROBE	Interruption line between the I/O-processor and the main-processor. If this signal is 'low' the I/O-processor can communicate to the main-processor or the other way around
SW1 / SW2	Switching signals from the TDA9860 IC7590 to the audio source selector on the Dolby Audio Module (front, EXT1, EXT2 or EXT3) which selects the sound for the headphone plug for the right-side video picture (sub-picture) (see table in diagram)
SYS1	System selection from I/O-processor to video processor IC7352 and comb filter for chrominance crystal selection (PAL BG = 0, NTSC M = 1)
SYS2	System selection from I/O-processor to video processor IC7352 and comb filter for chrominance crystal selection (PAL BG = 1, NTSC M = 0)
SS+/SS-	Amplified audio signal from the surround Sound Panel to the Clickfit panel for the subwoofer
TEST	Test pin for production purposes
TUN_AGC	Automatic Gain Control from IC9R (TDA9815) to the 2nd tuner on the VDS Module
TUN_CVBS	CVBS signal from 2nd tuner to source select IC9L on the VDS Module
TXT	Teletext
Text DualScreen	Teletext or NexTView (EPG) DualScreen. Ability to display a video picture on the left side and a Teletext or NexTView (EPG) picture on the right side (so NOT the ability to display two video pictures side by side)
TXT_EN	Teletext enable signal. Via this signal only in full-TXT mode the PIP can use TXT_KILL to display PIP on top of a full-TXT picture only (and not OSD, menu's and mixed TXT mode)
TXT_KILL	Fast blanking signal from PIP to video controller part to overrule the fast blanking signal of TXT in order to display PIP in TXT (only possible in full-TXT mode)
U	Colour difference signal Blue (B-Y)
V	Colour difference signal Red (R-Y)
VA	Vertical Acquisition from the video processor IC7352 to the Feature Box and the YUV-interface
V_BCI	Beam Current Info signal derived from the EHT-INFO (peak white limiting) to the blending circuit on the TXT+control module to enable transparent menu's
VD	Vertical Drive from the Feature Box to the Digital Deflection Panel and to PIP and TXT
VDS	Video DualScreen. Ability to display two video pictures side by side (so NOT the ability a video picture on the left side and Teletext or NextTView (EPG) information on the right side)
VDS_STANDBY	Switching signal from the VDS-module which switches the VDS module to standby 60 seconds after de-activating the VDS-feature
VD_SYNC_POL	Detection signal which indicates whether the incoming vertical sync-pulses are positive ('high') or negative ('low')
VDD2	Supply voltage on TXT+control panel derived from +5V2 supply voltage
VDEFL-	Correction signal from N/S correction circuitry back to the frame output circuitry
VDNEG	Negative vertical drive signal from the Digital Deflection Panel to the frame output stage
VDPOS	Positive vertical drive signal from the Digital Deflection Panel to the frame output stage
VFB	Vertical flyback pulse from the frame output stage to the Digital Deflection Panel
VG2	Voltage on grid 2 of the picture tube
VOD	The 140V supply voltage after the series switch in the deflection part of the Large Signal Panel
VOLOT	The 140V supply voltage after the series switch for the DC shift circuitry
VOS	The 140V supply voltage before the series switch in the deflection part of the Large Signal Panel
VSCAVEM+	Supply voltage for SCAVEM derived from the VOD supply voltage
VT	Tuning voltage from power supply to the tuner
V_OUT	Signal from the blending circuit on the TXT+control module to the video controller on the SSP. This signal is derived from V-BCI to enable transparent menus
XTAL	Crystal
Y	Luminance signal
Y/CVBS_MAIN	Luminance/CVBS signal from the video matrix IC7406 on the Small Signal Panel to the COMB filter or direct to the video processor IC7352 and to TXT
Y/CVBS_COMB	Luminance/CVBS signal from the COMB filter to the video processor IC7352
Y/CVBS_PIP	Luminance/CVBS signal from the video matrix IC7406 on the Small Signal Panel to PIP
Y/CVBS_SC2_INPUT	Luminance/CVBS signal from Euroconnector 2 to the video matrix IC7406 on the Small Signal Panel
Y/CVBS_SC2_ OUTPUT	Luminance/CVBS for Project 50 sets and only CVBS or Y+C in non-Project 50 sets; the signal flows from the video matrix IC7406 to Euroconnector 2
Y/CVBS_FRONT_ INPUT	Luminance or CVBS signal from the front input panel (toblerone) to the video matrix IC7406 on the Small Signal Panel directly, or in case of 24" VGA via the VGA Interface panel
Y+C_FRONT_INPUT	CVBS by added Y and C on the front input panel; signal is fed to the video matrix IC7406 on the Small Signal Panel
YUV_DEC	YUV signals from video processor TDA914X (IC7352) to the YUV-interface
YUV_DW	YUV signals for the combined (left and right) VDS picture from IC9A (PIPO) to the source selector on the YUV-Interface module
YUV_FEAT	YUV signals from Feature Box to the video controller IC7500
YUV_INTERFACE	Normal (YUV_MAIN) or DualScreen (YUV_DW) picture from the source select (IC9V) on the YUV-Interface module to the Feature Box.
YUV_MAIN (MU,MV,MY)	YUV signals for the left-side VDS picture from the YUV-Interface to IC9A PIPO on the VDS Module. These signals are derived from YUV-DEC
YUV_ON/OFF	Switching signal for the (optional) histogram/black stretch module for switching on & off this module
YUV_SUB (SU,SV,SY)	YUV signals for the right-side VDS picture from the TDA914X on the VDS module to the IC9A PIPO on the VDS Module

12. Spare parts list / Stükliste / Liste des pièces

	4822 727 21518	LSP-SSP Poster MD2 2x
	4822 310 10674	Cable ext. kit

Repair kits

Supply kit MD2 (4822 310 10649)

1501	4822 253 30467	Fuse 6.3A 250V
1566	4822 252 11144	Fuse 3.15A 65V
1580	4822 252 51175	Fuse 2.5A 65V
2540	4822 126 12095	220pF 10% 2kV
3505	4822 117 12074	1,5Ω 10% 7W
6510	4822 130 31933	1n5061
6545	4822 130 41602	BYW95C/20
7520	4822 209 90025	MC44603P
7541	4822 130 10196	STW9NA60
7590	4822 130 20293	P0102BA

Line repair kit MD2 (4822 310 10649)

2420	4822 121 70595	1,2nF 5% 2kV
2420	4822 121 70581	1.5nF 5% 2kV
2420	4822 121 70594	1nF 5% 2kV
2421	4822 121 10507	470nF 5% 250V
2421	4822 121 10506	560nF 5% 250V
2421	4822 121 10649	1.2µF 5% 100V
2425	4822 121 70435	10nF 5% 2kV
2425	4822 121 70398	11nF 5% 2kV
6419	4822 130 41275	BY228/20
6421	4822 130 83185	BY359F-1500
6422	4822 130 33531	BY229F-600
7421	4822 130 63329	ON4923 (BU2525A)
7470	4822 130 63728	IRF620
7480	4822 130 63726	MTP3055EFI

Large Signal Panel [A]

Various

	4822 265 30389	2P male
	4822 265 31245	4P male v 2.5 ed
	4822 265 41461	10P male v 2.5 ed
	4822 265 41548	10P male v 2.5 gy
	4822 265 10416	10P male v 2.5 bl
	4822 265 31326	3P male
	4822 265 31246	6P male v 2.5 ed
	4822 264 40207	3P male v 2.5 gy
	4822 265 31247	3P m v 1,25 ed bl
	4822 265 31248	3P m v 1,25 ed gy
	4822 265 31242	2P male v 2.5 ed
	4822 265 41465	8P male v 2.5
	4822 320 11453	3P cable 0.5m
	4822 466 92954	Spacer
	4822 404 31344	Bracket PIP - 3th scart
	4822 492 70871	Spring fix trans
	4822 492 62076	Spring fix trans.
	4822 695 00005	Insulator for 7541
	4822 466 93461	Insulator 20 X 25
	4822 402 10161	Bracket for 5V panel
	4822 532 21513	Spacer 9.5mm
	4822 256 91879	Holder for 6567
	4822 404 31488	Bracket LOT
	4822 256 92053	Fuse holder
▲	4822 320 20216	EHT cable
1440	4822 071 51001	Fuse 0.1A 250V
1503▲	4822 070 33152	Fuse 3.15A 250V
1566▲	4822 071 54002	Fuse 4A 250V
1572▲	4822 071 52502	Fuse 2.5A 250V
1572▲	4822 071 54002	Fuse 4A 250V
1580▲	4822 071 52502	Fuse 2 5A 250V

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2400	4822 121 43368	47µF 160V
2402	4822 126 13185	680pF 10% 500V
2409	4822 126 13644	47pF 5% 63V
2411	4822 121 43875	47nF 5% 250V
2412	4822 126 11823	270pF 10% 500V
2417	4822 121 42408	220nF 5% 63V
2418	4822 126 12095	220pF 10% 2kV
2419	4822 121 70365	39nF 10% 400V
2420	4822 121 70581	1.5nF 5% 2kV
2420	4822 121 70594	1nF 5% 2kV
2420	4822 121 70595	1,2nF 5% 2kV
2421	4822 121 10506	560nF 5% 250V
2421	4822 121 10649	1.2µF 5% 100V
2425	4822 121 70398	11nF 5% 2Kk
2426	4822 121 10551	27nF 5% 630V
2426	4822 121 10658	24nF 5% 630V
2426	4822 121 10663	13nF 5% 630V
2431	4822 122 31177	470pF 10% 500V
2433	4822 121 10506	560nF 5% 250V
2433	4822 121 10507	470nF 5% 250V
2433	4822 121 10518	390nF 5% 250V
2433	4822 121 10629	430nF 5% 250V
2440	4822 126 11501	1,5nF 10% 500V
2442	4822 124 23265	4.7µF 20% 350V
2448	4822 121 41857	10nF 5% 250V
2448	4822 121 43856	4,7nF 5% 250V
2450	4822 121 10509	120nF 10% 250V
2457	4822 121 43179	18nF 5% 250V
2460	4822 122 31177	470pF 10% 500V
2461	4822 124 80791	470µF 20% 16V
2462	4822 124 80791	470µF 20% 16V
2463	4822 122 31177	470pF 10% 500V
2465	4822 122 31177	470pF 10% 500V
2466	4822 124 41387	470µF 20% 25V
2467	4822 121 10505	2.7nF 10% 50V
2468	4822 124 11521	1µF 20% 250V
2480	4822 124 11522	2.2µF 20% 100V
2481	4822 126 10334	470pF 10% 50V
2482	4822 124 22466	1µF 20% 50V
2503	4822 122 31175	1nF 10% 500V
2504	4822 121 43066	1nF 1% 400V
2505	4822 124 23492	220µF 50% 385V
2506	4822 121 40487	100nF 10% 400V
2507	4822 124 41184	470µF 20% 50V
2508	5322 121 42386	100nF 5% 63V
2509▲	4822 126 13841	1nF 20% 250V
2511	4822 126 11141	2,2nF 10% 1kV
2512	4822 126 11141	2,2nF 10% 1kV
2513	5322 121 42386	100nF 5% 63V
2514	4822 124 22263	220µF 20% 25V
2521	4822 122 32185	10pF 2% 100V
2522	4822 122 33302	1nF 5% 50V
2524	5322 121 42661	330nF 5% 63V
2525	4822 124 40255	100µF 20% 63V
2526	4822 126 10334	470pF 10% 50V
2527	4822 122 31175	1nF 10% 500V
2528	4822 121 41856	22nF 5% 250V
2531	4822 121 43066	1nF 1% 400V
2533	4822 124 40242	1µF 20% 63V
2534	4822 122 33524	22pF 5% 50V
2535	4822 126 12451	820pF 10% 50V
2538	4822 122 33531	2,2nF 10% 50V
2540	4822 126 12095	220pF 10% 2kV
2541	4822 122 31177	470pF 10% 500V
2542	4822 126 12095	220pF 10% 2kV
2543	4822 126 13451	2.2nF 10% 2kV
2544	4822 121 70696	2,2nF 5% 2kV
2545	4822 126 11824	100pF 10% 1kV
2548	5322 121 42386	100nF 5% 63V
2550▲	4822 126 10727	3,3nF 20% 400V
2554	5322 121 42386	100nF 5% 63V
2557	4822 121 43179	18nF 5% 250V
2559	4822 124 41596	22µF 20% 50V
2560	4822 122 31177	470pF 10% 500V
2562	5322 121 42465	68nF 5% 63V
2563	4822 124 11492	2200µF 20% 16V
2563	4822 124 80065	1000µF 20% 50V
2564	4822 126 11501	1,5nF 10% 500V
2565	4822 124 41596	22µF 20% 50V
2566	4822 124 40214	1000µF 20% 25V
2568	4822 126 11254	330pF 10% 2kV
2569	4822 124 22583	47µF 160V
2570	5322 121 42465	68nF 5% 63V
2571	4822 124 81029	100µF 20% 25V
2572	4822 122 31175	1nF 10% 500V
2573	4822 124 41663	2200µF 20% 35V
2574	4822 121 43526	47nF 5% 250V
2575	4822 126 13829	120pF 10% 500V
2580	5322 124 41468	1000µF 20% 40V
2581	4822 122 31175	1nF 10% 500V
2584	4822 121 41857	10nF 5% 250V
2591	4822 121 43526	47nF 5% 250V
2592	5322 121 42386	100nF 5% 63V
2593	4822 121 42408	220nF 5% 63V
2594	4822 121 42408	220nF 5% 63V
2596	5322 121 42386	100nF 5% 63V
2609	4822 126 13644	47pF 5% 63V
2612	4822 126 10334	470pF 10% 50V
2613	4822 126 10334	470pF 10% 50V
2615	5322 124 21189	100µF 20% 40V
2616	5322 121 42386	100nF 5% 63V
2617	4822 121 42408	220nF 5% 63V
2618	5322 121 42386	100nF 5% 63V
2620	5322 124 40641	10µF 20% 100V
2750	4822 124 40242	1µF 20% 63V
2751	4822 124 11523	4µ7 20% 35V
2752	4822 124 40246	4.7µF 20% 63V
2753	4822 121 41857	10nF 5% 250V
2754	5322 121 42386	100nF 5% 63V
2755	4822 124 41663	2200µF 20% 35V
2756	4822 124 40196	220µF 20% 16V
2756	4822 124 41643	100µF 20% 16V
2761	4822 121 42408	220nF 5% 63V
2762	4822 121 42408	220nF 5% 63V
2763	4822 122 33302	1nF 5% 50V
2765	4822 124 81262	33µF 20% 50V
2766	4822 124 81262	33µF 20% 50V
2767	5322 124 41468	1000µF 20% 40V
2768	5322 124 41468	1000µF 20% 40V
2776	4822 122 33531	2.2nF 10% 50V
2778	4822 122 33531	2.2nF 10% 50V
2787	4822 121 41856	22nF 5% 250V
2788	4822 121 41856	22nF 5% 250V

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3407	4822 116 83883	470Ω 5% 0.5W
3409	4822 116 52256	2k2 5% 0.5W
3411	4822 116 83864	10k 5% 0.5W
3412	4822 116 83864	10k 5% 0.5W
3413	4822 116 52231	820Ω 5% 0.5W
3414	4822 116 52219	330Ω 5% 0.5W
3415	4822 117 12077	2k7 5% 5W
3415	4822 117 12618	2k2 5% 5W
3416	4822 116 83883	470Ω 5% 0,5W
3417	4822 116 52176	10Ω 5% 0.5W
3419	4822 116 52176	10Ω 5% 0.5W
3423	4822 053 10688	6Ω8 5% 1W
3425	4822 116 52176	10Ω 5% 0.5W
3426	4822 116 52176	10Ω 5% 0.5W
3430	4822 050 11002	1k 1% 0.4W
3431	4822 050 11002	1k 1% 0.4W
3443▲	4822 052 11688	6Ω8 5% 0.5W
3448	4822 116 52234	100k 5% 0,5W
3449	4822 116 52297	68k 5% 0.5W
3449	4822 116 83884	47k 5% 0.5W
3450	4822 116 52264	27k 5% 0.5W
3450	4822 116 83882	39k 5% 0.5W
3451	4822 116 52271	33k 5% 0.5W
3451	4822 116 83884	47k 5% 0.5W
3452	4822 116 52254	20k 5% 0,5W
3457	4822 116 52292	560k 5% 0.5W
3457	4822 116 52298	680k 5% 0,5W
3458	4822 116 52272	330k 5% 0,5W
3458	4822 116 83874	220k 5% 0,5W
3458	4822 116 83878	270k 5% 0,5W
3459	4822 116 83883	470Ω 5% 0,5W
3460▲	4822 052 10108	1Ω 5% 0,33W
3461▲	4822 052 10108	1Ω 5% 0,33W
3462▲	4822 052 10108	1Ω 5% 0,33W
3463▲	4822 052 10108	1Ω 5% 0,33W
3465	4822 116 83864	10k 5% 0,5W
3466	4822 116 83864	10k 5% 0,5W
3467	4822 116 83864	10k 5% 0,5W
3468	4822 116 52234	100k 5% 0,5W
3469	4822 116 83884	47k 5% 0,5W
3470	4822 116 52269	3k3 5% 0,5W
3471	4822 116 52297	68k 5% 0.5W
3472	4822 116 52257	22k 5% 0,5W
3473	4822 050 11002	1k 1% 0.4W
3474	4822 050 11002	1k 1% 0.4W
3475	4822 050 11002	1k 1% 0.4W
3476	4822 116 52175	100Ω 5% 0.5W
3477	4822 116 52264	27k 5% 0,5W
3478	4822 053 10102	1k 5% 1W
3479▲	4822 052 10108	1Ω 5% 0,33W
3480	4822 116 52234	100k 5% 0,5W
3481	4822 050 11002	1k 1% 0,4W
3482	4822 116 83878	270k 5% 0.5W
3483	4822 050 24708	4Ω7 1% 0.6W
3484	4822 050 24708	4Ω7 1% 0.6W
3484	4822 116 52176	10Ω 5% 0,5W
3485	4822 050 27505	7M5 1% 0,6W
3486	4822 116 52234	100k 5% 0.5W
3487	4822 116 52175	100Ω 5% 0,5W
3488	4822 050 11002	1k 1% 0,4W
3489	4822 116 52193	39Ω 5% 0,5W
3502▲	4822 052 10109	10Ω 5% 0,33W
3505	4822 117 12074	1Ω5 10% 7W
3506	4822 116 40268	PTC/PTC 18Ω 276V
3507	4822 116 40268	PTC/PTC 18Ω 276V
3508	4822 116 83864	10k 5% 0,5W
3509	4822 116 52228	680Ω 5% 0,5W
3510	4822 116 83884	47k 5% 0,5W
3512	4822 050 11002	1k 1% 0.4W
3513▲	4822 052 10478	4Ω7 5% 0,33W
3514	4822 050 11002	1k 1% 0,4W
3515	4822 116 52175	100Ω 5% 0.5W
3516	4822 116 52195	47Ω 5% 0,5W
3517	4822 116 52175	100Ω 5% 0.5W
3518	4822 116 83868	150Ω 5% 0,5W
3519	4822 116 52256	2k2 5% 0.5W
3521	4822 116 52304	82k 5% 0,5W
3522	4822 116 52226	560Ω 5% 0,5W
3523	4822 116 52244	15k 5% 0.5W
3524▲	4822 052 10109	10Ω 5% 0,33W
3525	4822 116 52252	180k 5% 0.5W
3527	4822 116 52191	33Ω 5% 0,5W
3528	4822 053 10393	39k 5% 1W
3529	4822 117 10118	1M 5%
3530	4822 116 83961	6k8 5%
3531	4822 116 52256	2k2 5% 0,5W
3532	4822 116 52285	470k 5% 0,5W
3533	4822 116 52238	12k 5% 0.5W
3534	4822 116 83864	10k 5% 0,5W
3535	4822 116 52244	15k 5% 0.5W
3536	4822 116 83874	220k 5% 0,5W
3537	4822 116 83864	10k 5% 0,5W
3538	4822 116 52243	1k5 5% 0.5W
3539	4822 116 83864	10k 5% 0,5W
3541	4822 050 11002	1k 1% 0.4W
3543	4822 052 10108	1Ω 5% 0.33W
3544	4822 117 11488	33k 5% 3W
3545	4822 117 12235	680Ω 5% 7W
3546	4822 117 11745	0Ω39 5% 1W
3547	4822 117 11745	0Ω39 5% 1W
3548	4822 116 52207	1k2 5% 0.5W
3549	4822 116 83872	220Ω 5% 0,5W
3550▲	4822 053 21225	2M2 5% 0.5W
3551▲	4822 053 21475	4M7 5% 0,5W
3553	4822 116 52283	4k7 5% 0.5W
3554	4822 116 52175	100Ω 5% 0.5W
3555	4822 050 21604	160k 1% 0.6W
3556	4822 116 52231	820Ω 5% 0.5W
3557	4822 116 52245	150k 5% 0,5W
3558	4822 050 22702	2k7 1% 0,6W
3559	4822 101 11186	470Ω 30% LIN
3560	4822 116 52263	2k7 5% 0,5W
3561	4822 116 83864	10k 5% 0,5W
3562	4822 116 83872	220Ω 5% 0,5W
3563	4822 116 52263	2k7 5% 0,5W
3564	4822 116 52193	39Ω 5% 0,5W
3565	4822 116 83864	10k 5% 0.5W
3566	4822 116 52264	27k 5% 0.5W
3567	4822 053 10108	1Ω 5% 1W
3568	4822 116 52291	56k 5% 0.5W
3569	4822 116 52175	100Ω 5% 0,5W
3570	4822 116 83872	220Ω 5% 0,5W
3572	4822 116 83884	47k 5% 0,5W
3573	4822 117 12321	1Ω8 5%
3575	4822 053 11102	1k 5% 2W
3582	4822 116 83864	10k 5% 0,5W
3584	4822 116 83864	10k 5% 0,5W
3586	4822 116 52256	2k2 5% 0.5W
3587	4822 116 83864	10k 5% 0,5W
3588	4822 116 83864	10k 5% 0,5W
3589	4822 116 52235	1M 5% 0,5W
3590	4822 053 10473	47k 5% 1W
3592	4822 116 52283	4k7 5% 0,5W
3593	4822 050 11002	1k 1% 0,4W
3594	4822 116 83864	10k 5% 0.5W
3595	4822 116 52303	8k2 5% 0,5W
3596	4822 050 11002	1k 1% 0,4W
3597	4822 116 83864	10k 5% 0.5W
3598	4822 116 83864	10k 5% 0,5W
3601	4822 116 80176	1Ω 5% 0,5W
3601	4822 116 80676	1Ω5 5% 0,5W
3602	4822 116 80176	1Ω 5% 0.5W
3602	4822 116 80676	1Ω5 5% 0,5W
3603	4822 116 80176	1Ω 5% 0.5W
3603	4822 116 81039	1Ω8 5% 0,5W
3609▲	4822 052 10472	4k7 5% 0.33W
3610	4822 050 11002	1k 1% 0.4W
3611	4822 050 25601	560Ω 1% 0.6W
3612	4822 050 25601	560Ω 1% 0.6W
3613	4822 050 11002	1k 1% 0.4W
3614	4822 050 11002	1k 1% 0.4W
3617▲	4822 052 10158	1Ω5 5% 0.33W
3618	4822 116 83868	150Ω 5% o,5W
3618	4822 116 83872	220Ω 5% 0.5W
3619	4822 116 83868	150Ω 5% 0.5W
3619	4822 116 83872	220Ω 5% 0.5W
3620	4822 116 83864	10k 5% 0.5W
3752▲	4822 052 10828	8Ω2 5% 0.33W
3753▲	4822 052 10828	8Ω2 5% 0,33W
3755	4822 116 83006	2M7 5% 0.5W
3760	4822 116 52276	3k9 5% 0.5W
3761	4822 116 52283	4k7 5% 0.5W
3762	4822 116 52276	3k9 5% 0.5W
3763	4822 116 52228	680Ω 5% 0.5W
3764	4822 116 52283	4k7 5% 0.5W
3765	4822 116 52263	2k7 5% 0.5W
3765	4822 116 52289	5k6 5% 0.5W
3766	4822 050 11002	1k 1% 0,4W
3770	4822 116 52251	18k 5% 0.5W
3771	4822 116 83872	220Ω 5% 0.5W
3772	4822 116 83864	10k 5% 0.5W

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5400	4822 157 71467	39µF 10%
5402	4822 157 71453	27µF 10%
5410	4822 157 63252	Line driver transf.
5418	4822 526 10494	Ferrite bead
5421	4822 157 10398	Linearity corr. 25"/29" SF
5421	4822 157 10583	Linearity corr 28" SF
5421	4822 157 11061	Linearity corr. 24"/32" SF
5422	4822 157 11212	Bridge coil 24"/28" VGA
5422	4822 157 71535	Bridge coil 25"/29" SF
5422	4822 157 71829	Bridge coil 24"/28"/32" SF
5423	4822 157 71097	0.56µH 20%
5425	4822 526 10494	Ferrite bead
5426	4822 157 63506	Ferrite bead
5430▲	4822 140 10559	L.O.T. CML16P 28"/32"
5430▲	4822 140 10589	L.O.T. CML16P 24"
5430▲	4822 140 10618	L.O.T. 25"/28" VGA/29"
5460	4822 157 71466	2.2µH 20%
5461	4822 157 71466	2.2µH 20%
5462	4822 157 71466	2.2µH 20%
5480	4822 157 63253	Choke CU15
5507	4822 157 10419	100µH 10%
5525	4822 526 10494	Ferrite bead
5542	4822 157 63506	Ferrite bead
5543	4822 526 10494	Ferrite bead
5544	4822 157 63506	Ferrite bead
5545	4822 157 63506	Ferrite bead
5550	4822 146 10724	Transf. supply CE425V
5561	4822 158 10525	330µH 10%
5567	4822 157 63506	Ferrite bead
5572	4822 526 10494	Ferrite bead
5617	4822 157 63506	Ferrite bead
5701	4822 526 10494	Ferrite bead
5750	4822 157 10452	10µH 10%
5751	4822 157 10452	10µH 10%

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6409	4822 130 61219	BZX79-C10
6421	4822 130 83185	BY359F-1500
6422	4822 130 33531	BY229F-600
6441	4822 130 42488	BYD33D
6451	4822 130 30862	BZX79-C9V1
6451	4822 130 34197	BZX79-C12
6452	4822 130 30621	1N4148
6453	4822 130 34379	BZX79-C27
6454	4822 130 30842	BAV21
6460	5322 130 31938	BYV27-200
6462	5322 130 31938	BYV27-200
6463	5322 130 31938	BYV27-200
6465	4822 130 42488	BYD33D
6466	4822 130 42488	BYD33D
6471	4822 130 61219	BZX79-C10
6479	4822 130 34383	BZX79-C47
6480	4822 130 61219	BZX79-C10
6481	4822 130 30621	1N4148
6482	5322 130 31504	BZX79-C3V3
6483	4822 130 30842	BAV21
6506	4822 130 42488	BYD33D
6507	4822 130 42488	BYD33D
6508	4822 130 42488	BYD33D
6509	5322 130 34563	BZX79-C2V7
6510	4822 130 31933	1N5061
6511	4822 130 31933	1N5061
6512	4822 130 31933	1N5061
6513	4822 130 31933	1N5061
6514	5322 130 34563	BZX79-C2V7
6515	4822 130 30621	1N4148
6516	4822 130 31983	BAT85
6518	4822 130 30621	1N4148
6524	4822 130 31631	BYV10-20
6525	4822 130 31982	BYV27-100
6540	4822 130 31933	1N5061
6541	4822 130 31933	1N5061
6542	4822 130 42606	BYD33J
6545	4822 130 32343	BYV26C
6548	4822 130 42488	BYD33D
6550	4822 130 34441	BZX79-C22
6560	4822 130 34278	BZX79-C6V8
6561	4822 130 31982	BYV27-100
6562	4822 130 80791	BYV28-200/20
6562	4822 130 83865	SB360
6563	4822 130 30621	1N4148
6564	4822 130 34233	BZX79-F5V1
6566	4822 130 31933	1N5061
6567	4822 130 81123	BY229F-800
6571	4822 130 80983	BYW29F-150
6572	4822 130 80791	BYV28-200/20
6573	4822 130 80791	BYV28-200/20
6576	4822 130 31983	BAT85
6577	4822 130 31983	BAT85
6581	5322 130 31938	BYV27-200
6590	4822 130 42606	BYD33J
6591	4822 130 30621	1N4148
6592	4822 130 34197	BZX79-C12
6614	5322 130 31938	BYV27-200
6617	4822 130 42488	BYD33D
6618	4822 130 32904	BZV85
6618	5322 130 33635	BZV85-C8V2
6620	4822 130 42488	BYD33D
6753	4822 130 34195	BZX79-C13
6754	4822 130 31024	BZX79-C18
6755	4822 130 30621	1N4148
6756	4822 130 30621	1N4148
6757	4822 130 30621	1N4148
6770	4822 130 30621	1N4148

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7408	4822 130 63316	BSN304
7409	4822 130 41594	PH2369
7421	4822 130 10815	BU2520D
7470	4822 130 63546	IRF620FI
7475	4822 130 42159	BF819
7480	4822 130 63546	IRF620FI
7480	4822 130 63726	MTP3055EFI
7507	4822 130 10195	BT137-800E
7512	4822 130 40959	BC547B
7513	4822 130 44568	BC557B
7514	4822 130 44568	BC557B
7515	4822 130 44568	BC557B
7520	4822 209 15338	MC44604P
7541	4822 130 10196	STW9NA60
7555	4822 209 81397	TL431CLP
7556▲	4822 130 10816	SOC1014TV
7560	4822 209 72042	MC78L05ACP
7561	4822 130 40937	BC548B
7561	4822 130 40959	BC547B
7562	4822 130 40937	BC548B
7562	4822 130 40959	BC547B
7569	4822 209 12334	L4940V85
7588	4822 130 44196	BC548C
7588	4822 130 44503	BC547C
7589	4822 130 40937	BC548B
7589	4822 130 40959	BC547B
7590	4822 130 10243	2N5064
7591	4822 130 40937	BC548B
7591	4822 130 40959	BC547B
7592	4822 130 40937	BC548B
7592	4822 130 40959	BC547B
7600	4822 209 90009	TDA8177
7761	4822 209 32641	TDA2616Q
7770	4822 130 44197	BC558B
7770	4822 130 44568	BC557B

Mainsfilter [B]

Various

	4822 256 30496	Fuse holder
	4822 265 30389	2P male
1046	4822 212 11145	Mainsfilter panel MD2.2x
1501▲	4822 253 30467	Fuse 6.3A

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2500	4822 126 13589	470nF 20% 275V
2501	4822 121 70141	33nF 5% 400V
2506	4822 124 11913	22nF 20% 275V

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3503	4822 111 20403	470Ω 10%

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5503	4822 146 10419	Mainsfilter

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6501	4822 130 34379	BZX79-C27
6503	4822 130 34379	BZX79-C27

+5V supply panel [C]

Various

	4822 265 10428	pin strip
1050	4822 212 10544	+5V2 supply panel 1.6A
1050	4822 212 11212	+5V2 supply panel 2.5A
1050	4822 212 11215	+5V2 supply panel 2.1A

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2504	5322 126 10184	680pF 5% 50V
2505	4822 124 11951	470µF 20% 35V
2505	4822 124 41716	220µF 20% 35V
2507	4822 126 10002	100nF 20% 25V
2508	4822 126 13833	150nF 10% 16V
2509	4822 122 33177	10nF 10% 50V
2509	4822 126 13833	150nF 10% 16V
2510	4822 126 10002	100nF 20% 25V
2520	5322 122 32654	22nF 10% 63V
2521	5322 122 34123	1nF 10% 50V
2530	5322 124 41468	1000µF 20% 40V

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3501	4822 051 20332	3k3 5% 0,1W
3501	4822 051 20822	8k2 5% 0,1W
3502	4822 117 10833	10k 1% 0,1W
3503	4822 051 20472	4k7 5% 0.1W
3503	4822 117 10833	10k 5% 0,1W
3504	4822 051 10102	1k 2% 0.25W
3505	4822 051 20228	2Ω2 5% 0.1W
3505	4822 051 20478	4Ω7 5% 0.1W
3507	4822 051 20104	100k 5% 0.1W
3508	4822 117 10834	47k 1% 0,1W
3509	4822 116 83933	15k 1% 0,1W
3510	4822 051 20108	1Ω 5% 0.1W
3511	4822 051 20108	1Ω 5% 0,1W
3512	4822 051 20108	1Ω 5% 0.1W
3513	4822 051 20108	1Ω 5% 0.1W
3514	4822 051 20108	1Ω 5% 0.1W
3515	4822 051 20108	1Ω 5% 0,1W
3516	4822 051 20108	1Ω 5% 0.1W
3517	4822 051 20108	1Ω 5% 0.1W
3518	4822 051 20108	1Ω 5% 0.1W
3519	4822 051 20108	1Ω 5% 0.1W
3520	4822 051 10102	1k 2% 0.25W
3520	4822 117 11449	2k2 5% 0,1W
3521	4822 051 20124	120k 5% 0.1W
3521	4822 051 20334	330k 5% 0.1W
3521	4822 051 20474	470k 5% 0.1W
3523	4822 051 20108	1Ω 5% 0.1W
3524	4822 051 20108	1Ω 5% 0.1W
3525	4822 051 20108	1Ω 5% 0.1W
3526	4822 051 20108	1Ω 5% 0.1W
3527	4822 051 20108	1Ω 5% 0,1W
3528	4822 051 20108	1Ω 5% 0,1W
3529	4822 051 20108	1Ω 5% 0,1W
3530	4822 051 20108	1Ω 5% 0,1W
3531	4822 051 20108	1Ω 5% 0.1W
3532	4822 051 20108	1Ω 5% 0,1W
3533	4822 051 20108	1Ω 5% 0,1W
3534	4822 051 20108	1Ω 5% 0,1W
3535	4822 051 20108	1Ω 5% 0,1W

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5505	4822 157 71457	33µH 10%
5508	4822 157 71466	2.2µH 20%
5520	4822 146 10741	5V regulator coil 2.1A/2.5A
5520	4822 157 10305	5V regulator coil 1.6A
5522	4822 157 63506	Ferrite bead

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6501	4822 130 80125	BZX84-C5V6
6501	5322 130 80212	BZX84-C18
6510	4822 130 30621	1N4148
6510	4822 130 31983	BAT85
6520	5322 130 32677	1N5822
6521	4822 130 83801	PBYR745F

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7502	4822 130 60511	BC847B
7503	4822 130 60511	BC847B
7508	4822 209 12728	MC34163P

DDP (geometry) panel [D]

Various

	4822 265 51383	22P strip
1013	4822 212 10547	DDP panel
1310	5322 242 73686	Crystal 12 00 MHz

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2304	4822 124 41579	10µF 20% 50V
2306	4822 124 40242	1µF 20% 63V
2308	5322 122 32658	22pF 5% 50V
2309	5322 122 32658	22pF 5% 50V
2310	4822 126 13561	220nF 10% 16V
2312	5322 122 32452	47pF 5% 63V
2315	4822 126 10002	100nF 20% 25V
2316	4822 126 10002	100nF 20% 25V
2317	4822 126 10002	100nF 20% 25V
2318	4822 124 40242	1µF 20% 63V
2319	4822 122 33575	220pF 5% 50V
2320	5322 116 80853	560pF 5% 63V
2321	4822 126 10002	100nF 20% 25V
2326	4822 126 10002	100nF 20% 25V
2327	4822 126 13473	220nF 20% 50V
2330	4822 122 32535	680pF 10% 63V
2331	4822 126 13473	220nF 20% 50V
2334	4822 122 33177	10nF 20% 50V
2337	4822 126 10002	100nF 20% 25V
2338	4822 122 33177	10nF 20% 50V
2343	4822 126 13561	220nF 10% 16V
2344	4822 126 13561	220nF 10% 16V
2345	4822 126 10002	100nF 20% 25V
2346	4822 126 13694	68pF 1% 63V
2347	4822 126 13296	100nF 10% 16V
2348	5322 122 32658	22pF 5% 50V
2349	5322 122 32452	47pF 5% 63V
2353	4822 124 80622	470µF 35V
2354	4822 124 41584	100µF 20% 10V
2355	4822 124 41584	100µF 20% 10V
2357	4822 124 41584	100µF 20% 10V
2359	4822 124 81029	100µF 20% 25V
2360	5322 122 32452	47pF 5% 63V
2362	4822 122 33177	10nF 20% 50V
2371	4822 124 40246	4.7µF 20% 63V
2372	4822 126 13561	220nF 10% 16V
2390	5322 122 34099	470pF 10% 63V
2391	4822 126 10002	100nF 20% 25V
2392	4822 126 13561	220nF 10% 16V

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3305	4822 050 11002	1k 1% 0.4W
3306	4822 051 20333	33k 5% 0.1W
3307	4822 117 11449	2k2 1% 0.1W
3308	4822 050 11002	1k 1% 0.4W
3310	4822 051 20105	1M 5% 0.1W
3311	4822 050 11002	1k 1% 0.4W
3312	4822 116 52269	3k3 5% 0.5W
3314	4822 116 52175	100Ω 5% 0.5W
3315	4822 116 52175	100Ω 5% 0.5W
3316	4822 117 10833	10k 1% 0.1W
3317	4822 051 10102	1k 2% 0.25W
3318	4822 051 10102	1k 2% 0.25W
3319	4822 117 11449	2k2 1% 0.1W
3320	4822 051 20391	390Ω 5% 0.1W
3323	4822 117 10833	10k 1% 0.1W
3324	4822 051 20101	100Ω 5% 0.1W
3326	4822 116 52235	1M 5% 0.5W
3327	4822 116 52285	470k 5% 0.5W
3328	4822 051 20473	47k 5% 0.1W
3329	4822 116 52305	820k 5% 0.5W
3330	4822 116 83864	10k 5% 0.5W
3331	4822 051 20474	470k 5% 0.1W
3332	4822 116 52175	100Ω 5% 0.5W
3333	4822 051 20473	47k 5% 0.1W
3334	4822 051 20473	47k 5% 0.1W
3336	4822 116 52283	4k7 5% 0.5W
3337	4822 051 10102	1k 2% 0.25W
3338	4822 051 20122	1k2 5% 0.1W
3339	4822 116 52228	680Ω 5% 0.5W
3341	4822 051 20391	390Ω 5% 0.1W
3342	4822 117 11139	1k5 1% 0.1W
3343	4822 050 23601	360Ω 1% 0.6W
3344	4822 050 23601	360Ω 1% 0.6W
3345	4822 050 21002	1k 1% 0.6W
3346	4822 050 21002	1k 1% 0.6W
3347	4822 051 20229	22Ω 5% 0.1W
3351	4822 051 10102	1k 2% 0.25W
3352	4822 051 20332	3k3 5% 0.1W
3353	4822 052 10338	3Ω3 5% 0.33W
3357	4822 052 10129	12Ω 5% 0.33W
3359	4822 050 11002	1k 1% 0.4W
3360	4822 051 20273	27k 5% 0.1W

3361	4822 051 20274	270k 5% 0.1W
3363	4822 116 52252	180k 5% 0.5W
3364	4822 051 20273	27k 5% 0.1W
3371	4822 051 20473	47k 5% 0.1W
3372	4822 051 20824	820k 5% 0.1W
3386	4822 116 52238	12k 5% 0 5W
3387	4822 051 10102	1k 2% 0 25W
3388	4822 051 20339	33Ω 5% 0 1W
3389	4822 051 20334	330k 5% 0.1W
3390	4822 051 20104	100k 5% 0.1W
3391	4822 117 10833	10k 1% 0.1W
3392	4822 051 20472	4k7 5% 0.1W
3396	4822 116 52305	820k 5% 0.5W
3397	4822 051 20154	150k 5% 0.1W
3999	4822 051 20479	47Ω 5% 0.1W
4xxx	4822 051 10008	0Ω 5% 0.25W

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5316	4822 157 51462	10μH 10%
5353	4822 158 10604	6.8 μH 10%
5354	4822 158 10604	6.8 μH 10%

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6306	4822 130 34441	BZX79-C22
6307	4822 130 34173	BZX79-F5V6
6316	4822 130 30621	1N4148
6318	4822 130 30621	1N4148
6320	4822 130 30621	1N4148
6321	4822 130 30621	1N4148
6322	4822 130 30621	1N4148
6323	4822 130 30621	1N4148
6334	4822 130 30621	1N4148
6359	4822 130 30621	1N4148
6362	4822 130 30621	1N4148
6363	4822 130 30621	1N4148
6365	4822 130 30621	1N4148
6371	4822 130 30621	1N4148
6390	4822 130 30621	1N4148
6391	4822 130 34145	BZX79-C39
6393	4822 130 30621	1N4148
6394	4822 130 30621	1N4148

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7306	4822 130 42513	BC858C
7307	4822 130 42513	BC858C
7308	5322 130 41982	BC848B
7315	4822 209 90038	TDA9155/N6
7320	5322 130 41982	BC848B
7335	5322 209 61487	LM358N
7342	5322 130 41982	BC848B
7360	5322 209 61487	LM358N
7371	4822 130 42513	BC858C
7390	4822 130 42513	BC858C
7391	5322 130 42136	BC848C
7392	4822 130 42513	BC858C

Picture tube + SCAVEM panel [E]

Various

	4822 492 70788	Spring fix IC
▲	4822 255 70305	Socket for CRT 24"/25"/28" 29"
▲	4822 267 51249	Socket for CRT 32"
	4822 265 31246	6P male v 2 5
	4822 265 31242	2P male v 2 5
	4822 265 41451	9P male v 1.25
	4822 264 40207	3P male
	4822 320 11284	6P cable 0 41M
1030	4822 212 11155	PTP 6101. NO HEATS POLYG
1030	4822 212 11163	PTP+SVM 6101. HEATS POLYG
1030	4822 212 11164	PTP+SVM 6101. HEATS DAF
1030	4822 212 11165	PTP+SVM 6111. HEATS POLYG
1030	4822 212 11166	PTP+SVM 6111. HEATS DAF

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2325	4822 124 40246	4.7μF 20% 63V
2330	5322 122 32658	22pF 5% 50V
2330	5322 122 32481	15pF 5% 50V
2332	5322 126 10223	4.7nF 10% 63V
2333	4822 122 33891	3.3nF 10% 63V
2334	4822 126 13694	68pF 1% 63V
2336	4822 122 33342	33nF 10% 63V
2337	4822 121 42068	33nF 10% 400V
2338	5322 126 10184	680pF 5% 50V
2340	5322 122 32481	15pF 5% 50V
2340	5322 122 32658	22pF 5% 50V
2341	5322 122 33244	8.2pF 5% 50V
2341	5322 122 32287	4.7pF 5% 50V
2342	5322 126 10223	4.7nF 10% 63V
2343	4822 122 33891	3.3nF 10% 63V
2344	4822 126 13694	68pF 1% 63V
2346	4822 122 33342	33nF 10% 63V
2347	4822 121 42068	33nF 10% 400V
2348	4822 126 13461	680pF 10% 50V
2350	5322 122 32481	15pF 5% 50V
2350	5322 122 32658	22pF 5% 50V
2351	5322 122 33244	8,2pF 5% 50V
2351	5322 122 32287	4,7pF 5% 50V
2352	5322 126 10223	4,7nF 10% 63V
2353	4822 122 33891	3,3nF 10% 63V
2354	4822 126 13694	68pF 1% 63V
2356	4822 122 33342	33nF 10% 63V
2357	4822 121 42068	33nF 10% 400V
2358	4822 126 13461	680pF 10% 50V
2360	5322 122 31946	27pF 5% 63V
2370	4822 124 23494	10μF 20% 250V
2371	5322 122 32654	22nF 10% 63V
2372	4822 124 41643	100μF 20% 16V
2374	5322 122 32654	22nF 10% 63V
2376	4822 124 41579	10μF 20% 50V
2381	4822 122 31175	1nF 10% 500V
2393	4822 122 33177	10nF 20% 50V
2397	4822 126 12274	1500pF 10% 2kV
2400	4822 124 41643	100μF 20% 16V
2401	5322 122 32481	15pF 5% 50V
2402	4822 126 13689	18pF 1% 63V
2403	5322 122 32658	22pF 5% 50V
2404	4822 124 40433	47μF 20% 25V
2405	5322 122 32286	3,3pF 5% 50V
2406	4822 126 10002	100nF 20% 25V
2407	4822 122 33575	220pF 5% 50V
2409	4822 121 42007	100nF 10% 100V
2410	5322 122 32654	22nF 10% 63V
2411	4822 124 40764	22μF 100 V
2412	4822 126 11308	47pF 5% 500V
2420	4822 121 41934	22nF 10% 100V

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3324	4822 117 10833	10k 1% 0,1W
3325	4822 051 10102	1k 2% 0,25W
3326	4822 051 20272	2k7 5% 0,1W
3327	4822 051 20223	22k 5% 0,1W
3330	4822 051 20182	1k8 5% 0,1W
3331	4822 050 21204	120k 1% 0,6W
3332	4822 051 20272	2k7 5% 0,1W
3333	4822 051 20479	47Ω 5% 0,1W
3333	4822 051 20008	0Ω 5% 0.1W
3334	4822 116 52175	100Ω 5% 0.5W
3335	4822 111 30991	680Ω 10%
3336	4822 051 20008	0Ω 5% 0.1W
3337	4822 051 20822	8k2 5% 0.1W
3338	4822 051 10102	1k 2% 0.25W
3339	4822 050 11002	1k 1% 0.4W
3340	4822 051 20182	1k8 5% 0,1W
3341	4822 050 21204	120k 1% 0,6W
3342	4822 051 20272	2k7 5% 0,1W
3343	4822 051 20479	47Ω 5% 0,1W
3343	4822 051 20008	0Ω 5% 0.1W
3344	4822 116 52175	100Ω 5% 0,5W
3345	4822 111 30991	680Ω 10%
3346	4822 051 20391	390Ω 5% 0,1W
3347	4822 051 20822	8k2 5% 0,1W
3348	4822 051 10102	1k 2% 0,25W
3349	4822 050 11002	1k 1% 0,4W
3350	4822 051 20182	1k8 5% 0,1W
3351	4822 050 21204	120k 1% 0,6W
3352	4822 051 20272	2k7 5% 0,1W
3353	4822 051 20479	47Ω 5% 0.1W
3353	4822 051 20008	0Ω 55 0.1W
3354	4822 116 52175	100Ω 5% 0,5W
3355	4822 111 30991	680Ω 10%
3356	4822 116 52222	390Ω 5% 0,5W
3357	4822 051 20822	8k2 5% 0,1W
3358	4822 050 11002	1k 1% 0,4W
3359	4822 050 11002	1k 1% 0,4W
3360	4822 050 11002	1k 1% 0,4W
3361	4822 117 11149	82k 1% 0,1W
3362	4822 116 52239	120k 5% 0,5W
3363	4822 051 20473	47k 5% 0,1W
3364	4822 051 20473	47k 5% 0,1W
3369	4822 051 20184	180k 5% 0.1W
3370	4822 051 20154	150k 5% 0,1W
3371	4822 050 11002	1k 1% 0.4W
3372	4822 052 10688	6Ω8 5% 0,33W
3373	4822 052 10331	330Ω 5% 0,33W
3374	4822 051 20224	220k 5% 0,1W
3375	4822 051 20104	100k 5% 0.1W
3376	4822 051 20104	100k 5% 0,1W
3377	4822 051 20104	100k 5% 0,1W
3378	4822 116 52252	180k 5% 0,5W
3379	4822 051 20562	5k6 5% 0,1W
3380	4822 052 10108	1Ω 5% 0,33W
3381	4822 052 10151	150Ω 5% 0,33W
3382	4822 116 52191	33Ω 5% 0.5W
3383	4822 116 21231	VDR 1mA 50V MAX 115V
3385	4822 116 21231	VDR 1mA 50V MAX 115V
3386	4822 116 52191	33Ω 5% 0,5W
3387	4822 052 10108	1Ω 5% 0,33W
3392	4822 116 52255	200k 5% 0,5W
3393	4822 116 52238	12k 5% 0,5W
3396	4822 116 52175	100Ω 5% 0,5W
3397	4822 050 21502	1k5 1% 0,6W
3400	4822 052 10109	10Ω 5% 0,33W
3401	4822 051 20332	3k3 5% 0,1W
3402	4822 051 20272	2k7 5% 0,1W
3403	4822 117 11449	2k2 1% 0,1W
3404	4822 051 20121	120Ω 5% 0,1W
3405	4822 051 20183	18k 5% 0,1W
3406	4822 117 11449	2k2 1% 0,1W
3407	4822 116 83872	220Ω 5% 0,5W
3408	4822 117 11503	220Ω 1% 0.1W
3409	4822 051 20109	10Ω 5% 0,1W
3410	4822 051 10102	1k 2% 0,25W
3411	4822 051 20563	56k 5% 0,1W
3412	4822 051 20563	56k 5% 0,1W
3413	4822 051 10102	1k 2% 0,25W
3414	4822 053 11562	5k6 5% 2W
3415	4822 051 20109	10Ω 5% 0,1W
3416	4822 117 11449	2k2 1% 0,1W
3417	4822 051 20109	10Ω 5% 0,1W
3418	4822 051 20331	330Ω 5% 0,1W
3419	4822 116 83872	220Ω 5% 0,5W
3420	4822 116 52176	10Ω 5% 0,5W
9336	4822 116 52222	390Ω 5% 0,5W

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5346	4822 157 60123	6,8μH 10%
5356	4822 157 60123	6,8μH 10%
5372	4822 157 51216	5,6μH 10%
5373	4822 157 51216	5,6μH 10%
5380	4822 157 71452	18U 10% 10%
5381	4822 157 71452	18U 10% 10%
5400	4822 157 51216	5,6μH 10%
5414	4822 157 11181	Ferrite bead

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6323	5322 130 31504	BZX79-C3V3
6324▲	4822 130 61219	BZX79-C10
6325	5322 130 31504	BZX79 C3V3
6325	4822 130 32831	BZX79 F3V0
6335	4822 130 30842	BAV21
6345	4822 130 30842	BAV21
6355	4822 130 30842	BAV21
6370	4822 130 34281	BZX79-C15
6371	4822 130 30621	1N4148
6409	4822 130 30621	1N4148
6410	4822 130 30621	1N4148

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7324	5322 130 41983	BC858B
7330	4822 209 33365	TDA6111Q
7330	4822 209 91143	TDA6101Q
7338	5322 130 41983	BC858B
7340	4822 209 91143	TDA6101Q
7340	4822 209 33365	TDA6111Q
7348	5322 130 41983	BC858B
7350	4822 209 91143	TDA6101Q
7350	4822 209 33365	TDA6111Q
7358	5322 130 41983	BC858B
7374	4822 130 41646	BF423
7377▲	5322 130 41982	BC848B
7400	4822 130 44154	BF199
7405	4822 130 42589	BF370
7414	5322 130 41888	BD140-16
7415	5322 130 41886	BD139-16

North/South panel [F2]

Various

▲	4822 265 10429	Pinstrip
	4822 265 20509	2P male v grey
1091	4822 212 11287	N/S+frame rotation
1091	4822 212 11275	N/S+frame rotation+s-corr.

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2052	4822 124 40242	1μF 20% 50V
2053	4822 121 41856	22nF 10% 50V
2091	4822 121 10662	180nF 5% 250V

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3051	4822 116 52175	100Ω 5% 0,5W
3052	4822 116 52175	100Ω 5% 0,5W
3053	4822 051 20473	47k 5% 0,1W
3054	4822 051 20473	47k 5% 0,1W
3055	4822 051 20473	47k 5% 0,1W
3056	4822 051 20104	100k 5% 0,1W
3057	4822 051 20393	39k 5% 0,1W
3058	4822 051 20104	100k 5% 0,1W
3059	4822 051 20393	39k 5% 0,1W
3060	4822 116 52222	390Ω 5% 0,5W
3061	4822 051 20104	100k 5% 0,1W
3062	4822 051 20104	100k 5% 0,1W
3063	4822 117 10833	10k 5% 0,1W
3064	4822 051 20393	39k 5% 0,1W
3065	4822 051 20393	39k 5% 0,1W
3066	4822 051 20473	47k 5% 0,1W
3067	4822 117 10833	10k 5% 0,1W
3068	4822 051 20473	47k 5% 0,1W
3069	4822 051 20273	27k 5% 0,1W
3070	4822 051 20223	22k 5% 0,1W
3072	4822 051 20473	47k 5% 0,1W
3073	4822 050 11002	1k 5% 0,5W
3074	4822 116 52195	47Ω 5% 0,5W
3075	4822 116 52195	47Ω 5% 0,5W
3090	4822 116 83872	220Ω 5% 0,5W
3091	4822 116 52234	100k 5% 0,5W
3092	4822 116 83882	39k 5% 0,5W
3093	4822 116 52207	1k2 5% 0,5W
3094	4822 116 83884	47k 5% 0,5W
3097	4822 116 52234	100k 5% 0,5W
3998	4822 116 52269	4k7 5% 0,5W

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6051	4822 130 34197	BZX79-C12
6052	4822 130 34197	BZX79-C12
6053▲	4822 130 34173	BZX79-C5V6
6061	4822 130 10852	BZX284-C6V8
6062	4822 130 10852	BZX284-C6V8
6090	4822 130 34441	BZX79-C22

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7050	4822 209 63896	PCF8574AP
7051	5322 130 42136	BC848C
7052	5322 130 42136	BC848C
7053	5322 130 42136	BC848C
7054	4822 130 42513	BC858C
7055	4822 130 42513	BC858C
7056	5322 130 42136	BC848C
7057	4822 130 42513	BC858C
7058	4822 130 42513	BC858C
7059	5322 130 42136	BC848C
7060	5322 130 42136	BC848C
7061	5322 130 42136	BC848C
7062	5322 130 42136	BC848C
7090	4822 209 32126	SOC1012T
7091	4822 130 63728	IRF620
7093	4822 130 44503	BC547C

External DC-shoft panel [G2]

Various

	4822 265 20712	8P male
1500	4822 212 10702	External DC-shift panel

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2030	4822 122 31177	470pF 10% 500V
2031	4822 124 41643	100μF 20% 16V
2032	4822 124 41643	100μF 20% 16V
2033	4822 122 31177	470pF 10% 500V

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3030▲	4822 053 11689	68Ω 5% 2W
3031▲	4822 052 10108	1Ω 5% 0.33W
3032▲	4822 052 10108	1Ω 5% 0.33W

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5030▲	4822 157 70008	DC-shift coil

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6030	4822 130 42488	BYD33D
6033	4822 130 42488	BYD33D

Surround sound panel [H1]

Various

	4822 492 62076	Spring fix trans.
	4822 265 31246	6P male v 2,5
	4822 267 31874	2P male v 2,5
	4822 265 31251	5P male v 1,25
	4822 265 31245	4P male v 2,5
1500	4822 212 10682	Surround sound panel

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2750	4822 124 40242	1μF 20% 63V
2754	5322 121 42386	100nF 5% 63V
2755	4822 124 41663	2200μF 20% 35V
2756	4822 124 41596	22μF 20% 50V
2757	4822 124 41579	10μF 20% 50V
2758	4822 124 41579	10μF 20% 50V
2761	4822 121 42408	220nF 5% 63V
2762	4822 121 42408	220nF 5% 63V
2763	4822 122 33302	1nF 5% 50V
2764	4822 122 30043	10nF 80% 63V
2765	4822 124 41069	47μF 20% 63V
2766	5322 124 41468	1000μF 20% 40V
2776	4822 122 30057	2,7nF 10% 100V
2778	4822 122 30057	2,7nF 10% 100V
2787	4822 122 30103	22nF 80% 63V
2788	4822 122 30103	22nF 80% 63V

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3750	4822 053 11188	1Ω8 5% 2W
3752▲	4822 052 10828	8Ω2 5% 0,33W
3753▲	4822 052 10828	8Ω2 5% 0,33W
3760	4822 116 52276	3k9 5% 0,5W
3761	4822 116 52283	4k7 5% 0,5W
3762	4822 116 52276	3k9 5% 0,5W
3763	4822 116 52228	680Ω 5% 0,5W
3764	4822 116 52283	4k7 5% 0,5W
3770	4822 116 52251	18k 5% 0,5W
3771	4822 116 83872	220Ω 5% 0,5W
3772	4822 116 83864	10k 5% 0,5W

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6770▲	4822 130 30621	1N4148

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7761	4822 209 32641	TDA2616Q/N1
7770	4822 130 44568	BC557B

Clickfit panel [H2]

Various

	4822 265 10417	4P male v 2,5
	4822 267 31874	2P male v 2,5
	4822 265 31247	3P male v 1,25 black
	4822 265 31248	3P male v 1,25 grey
	4822 265 31245	4P male v 2,5
	4822 265 31242	2P male v 2,5
	4822 276 13094	Switch loudsp. ON/OFF
	4822 290 61196	Socket for ext. loudsp.
1052	4822 212 11142	Clickfit panel non cordless
1052	4822 212 11197	Clickfit panel cordless

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2702	4822 122 33302	1nF 5% 50V
2703	4822 124 81262	33μF 20% 50V
2704	4822 124 81262	33μF 20% 50V
2705	4822 122 40606	22nF 20% 50V
2706	4822 122 40606	22nF 20% 50V
2707	4822 122 40606	22nF 20% 50V
2708	4822 122 40606	22nF 20% 50V
2709	4822 122 33302	1nF 5% 50V

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3701	4822 116 83864	10k 5% 0,5W
3702	4822 116 83864	10k 5% 0,5W
3703	4822 116 83864	10k 5% 0,5W
3704	4822 116 83864	10k 5% 0,5W
3998	4822 050 11002	1k 1% 0,4W

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5701	4822 157 71097	0.56μH 20%
5702	4822 157 71097	0.56μH 20%
5703	4822 157 71097	0.56μH 20%
5704	4822 157 71097	0.56μH 20%

DBE panel [I]

Various

	4822 265 10431	Strip
	4822 265 31248	3P male v 1,25
1020	4822 212 10591	DBE panel subwoofer
1020	4822 212 10545	DBE panel acoustic horn
1020	4822 212 10803	DBE panel subwoofer dolby

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2759	4822 124 41579	10μF 20% 50V
2760	4822 124 41579	10μF 20% 50V
2761	4822 124 41579	10μF 20% 50V
2762	4822 126 10002	100nF 20% 25V
2763	4822 124 41579	10μF 20% 50V
2766	5322 122 31865	1,5nF 10% 63V
2767	5322 122 31865	1,5nF 10% 63V
2769	4822 121 43396	120nF 5% 63V
2769	5322 121 42465	68nF 5% 63V
2770	4822 124 22466	1μF 20% 50V
2775	5322 126 10465	3,9nF 10% 63V
2775	5322 122 34099	470pF 10% 63V
2776	4822 122 33893	18nF 10% 63V
2777	5322 122 34099	470pF 10% 63V
2779	4822 126 10002	100nF 20% 25V
2780	4822 122 33175	2,2nF 20% 50V
2781	4822 122 33175	2,2nF 20% 50V
2783	5322 126 10465	3,9nF 10% 63V
2783	5322 122 34099	470pF 10% 63V
2784	4822 121 43396	120nF 5% 63V
2784	5322 121 42465	68nF 5% 63V
2785	4822 124 22466	1μF 20% 50V
2788	4822 122 33893	18nF 10% 63V
2789	4822 126 10002	100nF 20% 25V
2790	5322 122 34099	470pF 10% 63V
2798	4822 124 40849	330μF 20% 16V
2799	4822 124 41643	100μF 20% 16V

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3752	4822 051 10101	100Ω 2% 0,25W
3753	4822 051 10101	100Ω 2% 0,25W
3754	4822 051 10101	100Ω 2% 0,25W
3755	4822 051 20223	22k 5% 0,1W
3756	4822 051 20332	3k3 5% 0,1W
3757	4822 051 20562	5k6 5% 0,1W
3758	4822 051 20104	100k 5% 0,1W
3759	4822 051 20563	56k 5% 0,1W
3761	4822 051 20104	100k 5% 0,1W
3762	4822 051 20104	100k 5% 0,1W
3764	4822 117 10833	10k 1% 0,1W
3765	4822 051 20104	100k 5% 0,1W
3766	4822 116 52175	100Ω 5% 0,5W
3767	4822 116 52175	100Ω 5% 0,5W
3769	4822 051 20471	470Ω 5% 0,1W
3769	4822 051 20561	560Ω 5% 0,1W
3770	4822 051 20104	100k 5% 0,1W
3770	4822 117 11149	82k 1% 0,1W
3771	4822 051 20471	470Ω 5% 0,1W
3771	4822 051 20561	560Ω 5% 0,1W
3772	4822 051 20393	39k 5% 0,1W
3772	4822 051 20473	47k 5% 0,1W
3773	4822 051 20563	56k 5% 0,1W
3774	4822 051 20563	56k 5% 0.1W
3775	4822 051 20821	820Ω 5% 0.1W
3775	4822 051 20682	6k8 5% 0.1W
3776	4822 051 20101	100Ω 5% 0.1W
3777	4822 051 20683	68k 5% 0.1W
3778	4822 051 10102	1k 2% 0,25W
3779	4822 051 20332	3k3 5% 0.1W
3780	4822 117 11448	180Ω 1% 0.1W
3781	4822 117 11448	180Ω 1% 0,1W
3782	4822 116 52213	180Ω 5% 0.5W
3783	4822 117 11448	180Ω 1% 0.1W
3784	4822 051 20471	470Ω 5% 0.1W
3784	4822 051 20561	560Ω 5% 0.1W
3785	4822 051 20104	100k 5% 0.1W
3785	4822 117 11149	82k 1% 0,1W
3786	4822 051 20471	470Ω 5% 0.1W
3786	4822 051 20561	560Ω 5% 0.1W
3787	4822 051 20393	39k 5% 0.1W
3787	4822 051 20473	47k 5% 0,1W
3788	4822 051 20563	56k 5% 0.1W
3789	4822 051 20563	56k 5% 0.1W
3790	4822 051 20821	820Ω 5% 0.1W
3790	4822 051 20682	6k8 5% 0.1W
3791	4822 051 20101	100Ω 5% 0.1W
3792	4822 051 20683	68k 5% 0,1W
3793	4822 051 10102	1k 2% 0,25W
3794	4822 051 20332	3k3 5% 0.1W
3795	4822 117 10833	10k 1% 0,1W
3796	4822 117 10833	10k 1% 0.1W
3798	4822 051 20332	3k3 5% 0.1W
3799	4822 051 20332	3k3 5% 0.1W
3999	4822 051 20479	47Ω 5% 0.1W
3999	4822 051 20279	27Ω 5% 0,1W
3999	4822 051 20339	33Ω 5% 0.1W

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6775	4822 130 30621	1N4148
6790	4822 130 30621	1N4148

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7770	5322 130 41982	BC848B
7771	5322 130 41982	BC848B
7772	4822 209 30095	LM833D
7773	5322 130 41982	BC848B
7774	5322 209 14481	HEF4053BT
7780	5322 130 41982	BC848B
7787	4822 209 30095	LM833D

Teletext & control panel [J1] [J2] [J3]

Various

	4822 265 10877	Pinstrip
	4822 267 50887	IC socket 8P
	4822 267 70255	IC socket 32P
1130	4822 212 11157	TXT-CONTROL 440P EPG NDW
1130	4822 212 11158	TXT-CONTROL 440P NEPG NDW
1130	4822 212 11159	TXT-CONTROL DW EPG M
1130	4822 212 11168	TXT-CONTROL EE 440P EPG
1130	4822 212 11196	TXT-CONTROL EE 440P EPG DW97
1130	4822 212 11261	TXT CONTROL EE 440P NEPG NDW97
1200	4822 242 10469	Crystal 24 MHz (overtune)
1201	4822 242 81191	Crystal 27 MHz

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2200	4822 124 41579	10μF 20% 50V
2201	4822 124 41584	100μF 20% 10V
2202	4822 126 10002	100nF 20% 25V
2203	4822 126 10002	100nF 20% 25V
2204	4822 126 13689	18pF 1% 63V
2205	4822 126 13689	18pF 1% 63V
2206	4822 126 10002	100nF 20% 25V
2207	4822 126 10002	100nF 20% 25V
2208	4822 126 10002	100nF 20% 25V
2209	4822 124 40242	1μF 20% 63V
2210	5322 122 34123	1nF 10% 50V
2220	5322 122 32654	22nF 10% 63V
2430	4822 126 11692	1μF 20% 16V
2435	5322 122 32658	22pF 5% 50V
2436	5322 122 32658	22pF 5% 50V
2437	5322 122 32658	22pF 5% 50V
2438	4822 122 32139	12pF 2% 63V
2441	5322 122 32658	22pF 5% 50V
2442	5322 122 32658	22pF 5% 50V
2451	4822 126 10002	100nF 20% 25V
2452	4822 126 10002	100nF 20% 25V
2453	4822 126 11692	1μF 20% 16V
2454	4822 124 41584	100μF 20% 10V
2455	4822 124 41584	100μF 20% 10V
2459	4822 124 41584	100μF 20% 10V
2461	4822 126 10002	100nF 20% 25V
2462	5322 122 32448	10pF 5% 50V
2463	5322 122 32448	10pF 5% 50V
2464	4822 126 11692	1μF 20% 16V
2465	5322 122 32658	22pF 5% 50V
2466	5322 122 34123	1nF 10% 50V
2468	4822 126 10002	100nF 20% 25V
2469	4822 126 10002	100nF 20% 25V
2472	4822 126 11692	1μF 20% 16V
2474	4822 126 11692	1μF 20% 16V
2475	4822 126 11692	1μF 20% 16V
2476	4822 126 11692	1μF 20% 16V
2477	4822 126 11692	1μF 20% 16V
2478	5322 122 31946	27pF 5% 63V
2479	4822 126 11692	1μF 20% 16V
2480	5322 122 32967	5.6pF 10% 63V
2481	4822 122 33797	47nF 20% 50V
2482	4822 122 33797	47nF 20% 50V
2483	4822 122 33797	47nF 20% 50V
2484	4822 122 33797	47nF 20% 50V
2485	4822 122 33797	47nF 20% 50V
2486	4822 122 33797	47nF 20% 50V
2487	5322 122 32966	39pF 5% 50V

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3200	4822 051 20471	470Ω 5% 0.1W
3201	4822 051 20331	330Ω 5% 0.1W
3202	4822 051 20563	56k 5% 0.1W
3203	4822 051 20822	8k2 5% 0.1W
3204	4822 051 20822	8k2 5% 0.1W
3205	4822 051 20473	47k 5% 0.1W
3206	4822 051 20332	3k3 5% 0.1W
3207	4822 117 10833	10k 1% 0 1W
3208	4822 051 20472	4k7 5% 0.1W
3209	4822 051 20472	4k7 5% 0.1W
3214	4822 051 20472	4k7 5% 0.1W
3215	4822 051 20474	470k 5% 0.1W
3216	4822 117 10833	10k 1% 0.1W
3218	4822 051 10102	1k 2% 0.25W
3219	4822 051 20472	4k7 5% 0.1W
3220	4822 051 10102	1k 2% 0.25W
3221	4822 117 11448	180Ω 1% 0.1W
3222	4822 051 10102	1k 2% 0.25W
3223	4822 117 11503	220Ω 1% 0 1W
3224	4822 051 20391	390Ω 5% 0.1W
3225	4822 051 20104	100k 5% 0.1W
3230	4822 051 20393	39k 5% 0.1W
3231	4822 051 20223	22k 5% 0.1W
3232	4822 051 20472	4k7 5% 0.1W
3236	4822 051 10102	1k 2% 0.25W
3237	4822 051 10102	1k 2% 0.25W
3238	4822 051 10102	1k 2% 0 25W
3239	4822 051 10102	1k 2% 0.25W
3240	4822 117 11503	220Ω 1% 0 1W
3241	4822 117 10833	10k 1% 0,1W
3242	4822 117 11503	220Ω 1% 0.1W
3243	4822 051 20101	100Ω 5% 0,1W
3250	4822 117 11503	220Ω 1% 0.1W
3251	4822 117 11503	220Ω 1% 0 1W
3252	4822 117 11503	220Ω 1% 0 1W
3253	4822 117 11503	220Ω 1% 0 1W
3254	4822 117 11503	220Ω 1% 0 1W
3255	4822 051 10102	1k 2% 0,25W
3256	4822 117 11503	220Ω 1% 0 1W
3410	4822 051 20391	390Ω 5% 0.1W
3411	4822 051 20331	330Ω 5% 0 1W
3412	4822 051 20391	390Ω 5% 0 1W
3413	4822 051 20331	330Ω 5% 0.1W
3414	4822 051 20391	390Ω 5% 0.1W
3415	4822 051 20331	330Ω 5% 0.1W
3416	4822 051 10102	1k 2% 0.25W
3417	4822 117 10353	150Ω 1% 0 1W
3418	4822 051 10102	1k 2% 0.25W
3419	4822 117 10353	150Ω 1% 0 1W
3420	4822 051 10102	1k 2% 0.25W
3421	4822 117 10353	150Ω 1% 0.1W
3422	4822 051 20101	100Ω 5% 0.1W
3423	4822 051 20101	100Ω 5% 0.1W
3430	4822 051 20108	1Ω 5% 0.1W
3431	4822 051 20109	10Ω 5% 0.1W
3432	4822 051 20159	15Ω 5% 0.1W
3433	4822 051 20159	15Ω 5% 0.1W
3434	4822 051 20159	15Ω 5% 0.1W
3435	4822 051 20159	15Ω 5% 0.1W
3436	4822 051 20159	15Ω 5% 0.1W

3437	4822 051 20101	100Ω 5% 0.1W
3438	4822 051 20101	100Ω 5% 0.1W
3439	4822 051 20101	100Ω 5% 0.1W
3440	4822 117 11139	1k5 1% 0.1W
3441	4822 117 11449	2k2 1% 0.1W
3442	4822 117 11449	2k2 1% 0.1W
3443	4822 051 20331	330Ω 5% 0.1W
3444	4822 051 20471	470Ω 5% 0.1W
3445	4822 051 10102	1k 2% 0.25W
3446	4822 051 10102	1k 2% 0.25W
3447	4822 117 11449	2k2 1% 0.1W
3448	4822 117 10833	10k 1% 0.1W
3449	4822 051 20472	4k7 5% 0.1W
3451	4822 051 20273	27k 5% 0.1W
3454	4822 117 11503	220Ω 1% 0.1W
3455	4822 117 10353	150Ω 1% 0.1W
3457	4822 117 10353	150Ω 1% 0.1W
3463	4822 051 20332	3k3 5% 0.1W
3471	4822 051 20331	330Ω 5% 0.1W
3472	4822 051 20121	120Ω 5% 0.1W
3473	4822 051 20121	120Ω 5% 0.1W
3474	4822 051 20121	120Ω 5% 0.1W
3475	4822 117 11448	180Ω 1% 0.1W
3476	4822 117 11448	180Ω 1% 0.1W
3477	4822 117 10353	150Ω 1% 0.1W
3478	4822 051 20821	820Ω 5% 0.1W
3480	4822 051 10102	1k 2% 0.25W
3481	4822 051 20101	100Ω 5% 0.1W
3482	4822 051 20101	100Ω 5% 0.1W
3483	4822 051 20472	4k7 5% 0.1W
3484	4822 051 20101	100Ω 5% 0.1W
3485	4822 051 20101	100Ω 5% 0.1W
3488	4822 051 20101	100Ω 5% 0.1W
3488	4822 051 20271	270Ω 5% 0.1W
3489	4822 051 20271	270Ω 5% 0.1W
3489	4822 051 20101	100Ω 5% 0.1W
3490	4822 051 20101	100Ω 5% 0.1W
3490	4822 051 20271	270Ω 5% 0.1W
3491	4822 051 20101	100Ω 5% 0.1W
3493	4822 051 20101	100Ω 5% 0.1W
3495	4822 051 20101	100Ω 5% 0.1W
3497	4822 117 10353	150Ω 1% 0.1W
3999	4822 051 20393	39k 5% 0.1W
3999	4822 051 20683	68k 5% 0.1W
3999	4822 051 20473	47k 5% 0.1W
3999	4822 051 20223	22k 5% 0.1W

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5200	4822 157 60147	2.2µH
5451	4822 157 60147	2.2µH
5452	4822 157 60147	2.2µH
5454	4822 157 53634	5.6µH 10%
5455	4822 157 60147	2.2µH
5460	4822 157 53575	3.3µH 10%
5461	4822 157 60147	2.2µH
5462	4822 157 60147	2.2µH
5463	4822 157 60147	2.2µH
5464	4822 157 53634	5.6µH 10%
5465	4822 157 71464	Coil trimm.
5466	4822 157 60147	2.2µH

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6219	4822 130 80954	LLZ-C5V6
6220	4822 130 80954	LLZ-C5V6
6221	4822 130 80446	LL4148
6221	4822 130 80446	LL4148
6221	4822 130 80446	LL4148
6221	4822 130 80446	LL4148
6225	4822 130 80954	LLZ-C5V6
6227	4822 130 81139	LLZ-C3V3
6228	4822 130 80622	BAT54
6229	4822 130 80954	LLZ-C5V6
6230	4822 130 80954	LLZ-C5V6
6231	4822 130 80954	LLZ-C5V6
6233	4822 130 80954	LLZ-C5V6

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7200	4822 209 90032	P90CE201AEB/02
7201	4822 209 33251	ST24C16B1
7202	4822 209 15507	Software V_00440
7202	4822 209 15509	Software V_00580
7202	4822 209 15508	Software V_00590
7203	5322 209 61433	N74F00D
7204	4822 209 15336	M29F040
7206	4822 209 15337	UM61512AM
7215	5322 130 41983	BC858B
7216	4822 209 73852	PMBT2369
7217	5322 130 41982	BC848B
7218	5322 130 41982	BC848B
7220	5322 130 41982	BC848B
7221	5322 130 42136	BC848C
7230	5322 130 41982	BC848B
7400	4822 209 15491	SAA5270WP/H/M4A
7400	4822 209 13642	SAA5270WP/B/M4A
7400	4822 209 15443	SAA5270WP/G/M4A
7449	4822 209 73852	PMBT2369
7453	4822 209 73852	PMBT2369
7454	4822 209 73852	PMBT2369
7455	4822 209 73852	PMBT2369
7456	4822 130 42513	BC858C
7457	4822 130 42131	BF550
7458	4822 130 42131	BF550
7459	5322 130 42136	BC848C
7460	4822 209 73852	PMBT2369
7461	5322 209 61001	N74F04D
7462	4822 209 60525	MSM514221B-RS-30
7463	5322 209 61001	N74F04D
7464	4822 209 90051	TDA8601
7465	5322 209 61004	N74F74D
7470	5322 130 34337	BAV99
7490	4822 209 90027	HYB514400BJ-70

Small Signal Panel [K]

Various

	4822 267 31987	Socket 2xcinch
	4822 265 10424	Socket SCART black
	4822 267 51058	Socket SCART blue
	4822 402 10161	Support
	4822 265 41461	10P male v 2.5
	4822 265 41548	10P male v 2.5 RFK2 gy
	4822 265 10416	10P male v 2.5 RFK2 bu
	4822 265 41451	9P male v 1.25 gy
	4822 265 41462	7P male v 1.25 wh
	4822 265 41466	10P male 2.5 RFK2
	4822 265 10787	11P male v 1.25 gy
	4822 265 31251	5P male v 1.25 gy
	4822 265 10788	11P male v 1.25 bl
	4822 265 41467	12P male v 2.5 RFK2
	4822 265 31009	Pinstrip 3P
	4822 320 11837	Cable 16P 12cm
	4822 320 11826	Cable 11P 45cm ED 1.25
	4822 321 63044	Cable 5P 33cm ED
	4822 320 11838	Cable 15P 40cm ED 1.25
1005	4822 212 11156	Service SSP MD2.2x
1100	4822 210 10691	UV916S
1352	4822 242 10697	Crystal 3.579545 MHz
1354	4822 242 10692	Crystal 4.433619 MHz
1600	4822 242 81002	Crystal 6MHz CST

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2001	5322 122 32654	22nF 10% 63V
2004	4822 126 10002	100nF 20% 50V
2009	4822 124 81029	100µF20% 25V
2350	5322 122 34123	1nF 10% 50V
2351	4822 126 13689	18pF 1% 63V
2352	5322 122 32659	33pF 5% 50V
2353	5322 122 32654	22nF 10% 63V
2360	5322 122 32661	56pF 5% 50V
2361	5322 122 32661	56pF 5% 50V
2362	4822 126 10002	100nF 20% 50V
2364	4822 126 10002	100nF 20% 50V
2366	4822 126 10002	100nF 20% 50V
2368	4822 121 51252	470nF 5% 63V
2370	4822 122 32627	2.7nF 10% 50V
2371	5322 122 32661	56pF 5% 50V
2373	5322 122 32661	56pF 5% 50V
2376	4822 126 10002	100nF 20% 50V
2378	4822 126 10002	100nF 20% 50V
2379	4822 126 10002	100nF 20% 50V
2380	4822 126 13296	100nF 10% 16V
2381	4822 126 10002	100nF 20% 50V
2382	4822 126 10002	100nF 20% 50V
2383	4822 124 40433	47µF 20% 25V
2385	4822 126 10002	100nF 20% 50V
2387	4822 124 40433	47µF 20% 25V
2388	4822 126 13689	18pF 1% 63V
2390	4822 126 10002	100nF 20% 50V
2391	4822 122 33175	2.2nF 205 50V
2392	4822 126 10002	100nF 20% 50V
2393	4822 126 10002	100nF 20% 50V
2394	4822 126 10002	100nF 20% 50V
2395	4822 126 10002	100nF 20% 50V
2396	4822 126 10002	100nF 20% 50V
2398	4822 126 13486	15pF 2% 63V
2400	4822 126 13473	220nF 20% 50V
2401	4822 121 42408	220nF 5% 63V
2402	4822 124 40756	1µF 20% 100V
2403	4822 126 13473	220nF 20% 50V
2404	4822 126 13473	220nF 20% 50V
2405	4822 126 13473	220nF 20% 50V
2406	4822 126 10002	100nF 20% 50V
2407	5322 122 31863	330pF 5% 50V
2408	5322 122 31863	330pF 5% 50V
2409	5322 122 31863	330pF 5% 50V
2410	5322 122 31863	330pF 5% 50V
2411	5322 122 31863	330pF 5% 50V
2412	5322 122 31863	330pF 5% 50V
2413	5322 122 31863	330pF 5% 50V
2414	5322 122 31863	330pF 5% 50V
2415	5322 122 31863	330pF 5% 50V
2416	5322 122 31863	330pF 5% 50V
2417	5322 122 31863	330pF 5% 50V
2418	5322 122 31863	330pF 5% 50V
2420	5322 122 31863	330pF 5% 50V
2421	4822 126 13473	220nF 20% 50V
2422	4822 124 40433	47µF 20% 25V
2423	5322 122 31863	330pF 5% 50V
2424	5322 122 31863	330pF 5% 50V
2425	4822 126 13473	220nF 20% 50V
2426	4822 126 13473	220nF 20% 50V
2427	4822 124 41596	22µF 20% 50V
2428	4822 124 41596	22µF 20% 50V
2429	4822 124 41596	22µF 20% 50V
2430	4822 124 41596	22µF 20% 50V
2431	4822 124 41596	22µF 20% 50V
2432	4822 124 41596	22µF 20% 50V
2434	4822 126 13473	220nF 20% 50V
2435	4822 126 13473	220nF 20% 50V
2436	4822 126 13473	220nF 20% 50V
2437	4822 126 13473	220nF 20% 50V
2438	4822 126 13473	220nF 20% 50V
2439	4822 126 13473	220nF 20% 50V
2440	4822 124 40433	47µF 20% 25V
2441	4822 126 13473	220nF 20% 50V
2442	4822 124 40433	47µF 20% 25V
2444	4822 124 41579	10µF 20% 50V
2445	4822 126 13473	220nF 20% 50V
2446	5322 122 32531	100pF 5% 50V
2447	4822 126 10002	100nF 20% 50V
2448	5322 122 32531	100pF 5% 50V
2449	5322 122 32531	100pF 5% 50V
2450	4822 124 41579	10µF 20% 50V
2451	4822 124 40196	220µF 20% 16V
2500	4822 126 12944	47nF 10% 50V
2501	4822 124 41596	22µF 20% 50V
2502	5322 122 32654	22nF 10% 63V
2503	5322 122 32966	39pF 5% 50V
2504	5322 122 32654	22nF 10% 63V
2505	4822 124 41596	22µF 20% 50V
2506	4822 121 41856	22nF 5% 250V
2507	5322 122 32966	39pF 5% 50V
2508	4822 121 41856	22nF 5% 250V
2509	4822 124 41596	22µF 20% 50V
2510	5322 122 32654	22nF 10% 63V
2511	5322 122 33861	120pF 10% 50V
2512	5322 122 32654	22nF 10% 63V
2513	5322 122 33244	8.2pF 5% 50V
2514	5322 122 32654	22nF 10% 63V
2516	5322 122 32654	22nF 10% 63V
2517	5322 122 33861	120pF 10% 50V
2519	5322 122 32654	22nF 10% 63V
2520	5322 122 32654	22nF 10% 63V
2521	5322 122 32654	22nF 10% 63V
2522	4822 122 33797	47nF 20% 50V
2523	5322 122 32654	22nF 10% 63V
2524	4822 124 40242	1µF 20% 63V
2525	5322 122 32661	56pF 5% 50V
2526	5322 122 32661	56pF 5% 50V
2527	5322 122 32661	56pF 5% 50V
2532	4822 124 40246	4.7µF 20% 63V
2533	4822 124 40849	330µF 20% 16V
2535	4822 126 13371	56nF 10% 50V
2536	5322 121 42661	330nF 5% 63V
2538	4822 126 13473	220nF 20% 50V
2540	4822 126 13473	220nF 20% 50V
2541	5322 122 32658	22pF 5% 50V
2542	4822 126 13473	220nF 20% 50V
2543	5322 122 32658	22pF 5% 50V
2544	4822 124 40242	1µF 20% 63V
2545	5322 122 32658	22pF 5% 50V
2546	4822 124 40242	1µF 20% 63V
2548	4822 126 10002	100nF 20% 50V
2549	5322 122 32658	22pF 5% 50V
2604	4822 126 10002	100nF 20% 50V
2608	5322 122 32531	100pF 5% 50V
2610	4822 126 10002	100nF 20% 50V
2611	4822 124 41579	10µF 20% 50V
2612	4822 124 41579	10µF 20% 50V
2613	4822 126 10002	100nF 20% 50V
2640	4822 122 33575	220pF 5% 50V
2641	5322 122 31863	330pF 5% 50V

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3003	4822 051 20101	100Ω 5% 0.1W
3007	4822 051 20223	22k 5% 0.1W
3008	4822 116 52257	22k 5% 0.5W
3009	4822 116 52257	22k 5% 0.5W
3013	4822 051 20473	47k 5% 0.1W
3014	4822 051 20472	4k7 5% 0.1W
3019	4822 051 20101	100Ω 5% 0.1W
3341	4822 116 52283	4k7 5% 0.5W
3342	4822 051 10102	1k 5% 0.1W
3349	4822 116 52257	22k 5% 0.5W
3350	4822 051 20101	100Ω 5% 0.1W
3352	4822 051 10102	1k 5% 0.1W
3353	4822 116 83868	150Ω 5% 0.5W
3354	4822 051 20243	24k 5% 0.1W
3357	4822 117 11139	1k5 1% 0.1W
3358	4822 116 83872	220Ω 5% 0.5W
3359	4822 116 83868	150Ω 5% 0.5W
3364	4822 116 52175	100Ω 5% 0.5W
3366	4822 116 52175	100Ω 5% 0.5W
3376	4822 051 20683	68k 5% 0.1W
3377	4822 117 12234	20M 5% 0.25W
3378	4822 117 12234	20M 5% 0.25W
3382	4822 116 83868	150Ω 5% 0.5W
3383	4822 116 83868	150Ω 5% 0.5W
3391	4822 051 20101	100Ω 5% 0.1W
3392	4822 051 20471	470Ω 5% 0.1W
3393	4822 051 20479	47Ω 5% 0.1W
3395	4822 051 20101	100Ω 5% 0.1W
3396	4822 051 10102	1k 5% 0.1W
3397	4822 051 20332	3k3 5% 0.1W
3398	4822 116 83872	220Ω 5% 0.5W
3400	4822 051 20561	560Ω 5% 0.1W
3401	4822 051 10102	1k 5% 0.1W
3402	4822 051 20681	680Ω 5% 0.1W
3403	4822 051 20101	100Ω 5% 0.1W
3404	4822 116 52175	100Ω 5% 0.5W
3405	4822 117 11139	1k5 1% 0.1W
3406	4822 117 11139	1k5 1% 0.1W
3407	4822 051 20472	4k7 5% 0.1W
3408	4822 117 11139	1k5 1% 0.1W
3409	4822 117 11139	1k5 1% 0.1W
3410	4822 117 11139	1k5 1% 0.1W
3411	4822 116 52283	4k7 5% 0.5W
3412	4822 116 52207	1k2 5% 0.5W
3413	4822 051 20561	560Ω 5% 0.1W
3414	4822 051 20471	470Ω 5% 0.1W
3415	4822 117 10833	10k 1% 0.1W
3418	4822 116 83864	10k 5% 0.5W
3419	4822 050 11002	1k 1% 0.4W
3420	4822 050 11002	1k 1% 0.4W
3421	4822 116 52201	75Ω 5% 0.5W
3422	4822 051 20224	220k 5% 0.1W
3423	4822 051 20224	220k 5% 0.1W
3424	4822 116 83864	10k 5% 0.5W
3425	4822 116 83868	150Ω 5% 0.5W
3426	4822 116 83868	150Ω 5% 0.5W
3427	4822 050 11002	1k 1% 0.4W
3428	4822 116 52201	75Ω 5% 0.5W
3429	4822 050 11002	1k 1% 0.4W
3430	4822 116 52201	75Ω 5% 0.5W
3431	4822 116 52201	75Ω 5% 0.5W
3432	4822 116 52175	100Ω 5% 0.5W
3433	4822 051 20224	220k 5% 0.1W
3434	4822 051 20224	220k 5% 0.1W
3435	4822 116 52201	75Ω 5% 0.5W
3436	4822 116 83864	10k 5% 0.5W
3437	4822 116 83868	150Ω 5% 0.5W
3438	4822 116 83868	150Ω 5% 0.5W
3439	4822 050 11002	1k 1% 0.4W
3440	4822 051 20471	470Ω 5% 0.1W
3441	4822 116 52201	75Ω 5% 0.5W
3442	4822 116 52175	100Ω 5% 0.5W
3443	4822 050 11002	1k 1% 0.4W
3444	4822 116 52201	75Ω 5% 0.5W
3445	4822 116 52201	75Ω 5% 0.5W
3446	4822 116 52201	75Ω 5% 0.5W
3447	4822 116 52201	75Ω 5% 0.5W
3448	4822 117 10833	10k 1% 0.1W
3449	4822 051 20104	100k 5% 0.1W
3450	4822 051 20104	100k 5% 0.1W
3451	4822 051 20104	100k 5% 0.1W
3452	4822 051 20104	100k 5% 0.1W
3453	4822 116 83868	150Ω 5% 0.5W
3454	4822 116 83868	150Ω 5% 0.5W
3455	4822 051 20104	100k 5% 0.1W
3456	4822 051 20104	100k 5% 0.1W
3457	4822 117 10833	10k 1% 0.1W
3458	4822 117 10833	10k 1% 0.1W
3459	4822 051 20561	560Ω 5% 0.1W
3460	4822 117 11503	220Ω 1% 0.1W
3461	4822 052 10478	4Ω7 5% 0.33W
3462	4822 051 20104	100k 5% 0.1W
3463	4822 116 52175	100Ω 5% 0.5W
3464	4822 051 20682	6k8 5% 0.1W
3465	4822 116 52175	100Ω 5% 0.5W
3466	4822 117 10833	10k 1% 0.1W
3467	4822 051 20104	100k 5% 0.1W
3468	4822 052 10478	4Ω7 5% 0.33W
3469	4822 116 52175	100Ω 5% 0.5W
3470	4822 051 20682	6k8 5% 0.1W
3471	4822 051 20682	6k8 5% 0.1W
3472	4822 116 52175	100Ω 5% 0.5W
3473	4822 051 20104	100k 5% 0.1W
3474	4822 051 20104	100k 5% 0.1W
3475	4822 052 10478	4Ω7 5% 0.33W
3476	4822 116 52175	100Ω 5% 0.5W
3477	4822 116 52257	22k 5% 0.5W
3478	4822 052 10478	4Ω7 5% 0.33W
3479	4822 051 20681	680Ω 5% 0.1%
3480	4822 051 20101	100Ω 5% 0.1W
3481	4822 117 10353	150Ω 1% 0.1W
3482	4822 051 20561	560Ω 5% 0.1W
3483	4822 116 83868	150Ω 5% 0.5W
3484	4822 116 52175	100Ω 5% 0.5W
3485	4822 116 52201	75Ω 5% 0.5W
3486	4822 116 52175	100Ω 5% 0.5W
3487	4822 116 52201	75Ω 5% 0.5W
3488	4822 051 10102	1k 2% 0.25W
3489	4822 051 10102	1k 2% 0.25W
3490	4822 051 20101	100Ω 5% 0.1W
3491	4822 051 10151	150Ω 2% 0.25W
3492	4822 051 20331	330Ω 5% 0.1W
3493	4822 051 20331	330Ω 5% 0.1W
3496	4822 051 20332	3k3 5% 0.1W
3497	4822 051 10369	36Ω 2% 0.25W
3498	4822 051 20271	270Ω 5% 0.1W
3499	4822 116 52249	1k8 5% 0.5W
3500	4822 052 10478	4Ω7 5% 0.33W
3503	4822 100 12221	2k2 30% lin
3506	4822 052 10478	4Ω7 5% 0.33W
3507	4822 052 10478	4Ω7 5% 0.33W
3508	4822 116 52219	330Ω 5% 0.5W
3509	4822 052 10478	4Ω7 5% 0.33W
3510	4822 116 52219	330Ω 5% 0.5W
3511	4822 051 20223	22k 5% 0.1W
3512	4822 051 20223	22k 5% 0.1W
3513	4822 051 20471	470Ω 5% 0.1W
3514	4822 051 20471	470Ω 5% 0.1W
3515	4822 117 10361	680Ω 1% 0.1W
3516	4822 051 20182	1k8 5% 0.1W
3517	4822 051 20101	100Ω 5% 0.1W
3518	4822 050 11002	1k 1% 0.4W
3519	4822 117 11503	220Ω 1% 0.1W
3520	4822 117 11503	220Ω 1% 0.1W
3521	4822 051 20333	33k 5% 0.1W
3522	4822 051 20184	180k 5% 0.1W
3523	4822 051 20223	22k 5% 0.1W
3524	4822 051 20473	47k 5% 0.1W
3525	4822 051 20223	22k 5% 0.1W
3526	4822 051 20471	470Ω 5% 0.1W
3527	4822 051 20471	470Ω 5% 0.1W
3528	4822 051 20681	680Ω 5% 0.1W
3529	4822 051 20182	1k8 5% 0.1W
3530	4822 051 20101	100Ω 5% 0.1W
3531	4822 051 20183	18k 5% 0.1W
3532	4822 051 20154	150k 5% 0.1W
3533	4822 051 20473	47k 5% 0.1w
3534	4822 051 20124	120k 5% 0.1W
3535	4822 052 10478	4Ω7 5% 0.33W
3536	4822 051 20121	120Ω 5% 0.1W
3537	4822 117 11596	390Ω 1% 0.1W
3538	4822 117 11596	390Ω 1% 0.1W
3539	4822 050 14701	470Ω 1% 0.4W
3540	4822 116 52202	82Ω 5% 0.5W
3541	4822 051 20829	82Ω 5% 0.1W
3542	4822 116 52202	82Ω 5% 0.5W
3543	4822 051 20829	82Ω 5% 0.1W
3544	4822 116 52202	82Ω 5% 0.5W
3546	4822 051 20471	470Ω 55 0.1W
3547	4822 117 11449	2k2 1% 0.1W
3548	4822 051 20229	22Ω 5% 0.1W
3549	4822 051 20829	82Ω 5% 0.1W
3550	4822 051 20822	8k2 5% 0.1W
3551	4822 051 20101	100Ω 5% 0.1W
3552	4822 117 11449	2k2 1% 0.1W
3554	4822 051 20472	4k7 5% 0.1W
3555	4822 117 10833	10k 1% 0.1W
3556	4822 051 20331	330Ω 55 0.1W
3557	4822 051 10102	1k 5% 0.1W
3558	4822 117 10833	10k 1% 0.1W
3559	4822 051 20101	100Ω 5% 0.1W
3560	4822 116 52175	100Ω 5% 0.5W
3561	4822 051 20008	0Ω 5% 0.1W
3562	4822 051 20008	0Ω 5% 0.1W
3564	4822 051 20101	100Ω 5% 0.1W
3565	4822 051 20331	330Ω 5% 0.1W
3600	4822 116 83883	470Ω 55 0.5W
3601	4822 117 10833	10k 1% 0.1W
3602	4822 116 52283	4k7 5% 0.5W
3603	4822 116 83864	10k 5% 0.5W
3604	4822 051 20101	100Ω 5% 0.1W
3605	4822 051 20101	100Ω 5% 0.1W
3606	4822 117 11449	2k2 1% 0.1W
3607	4822 117 11449	2k2 1% 0.1W
3608	4822 051 20472	4k7 5% 0.1W
3609	4822 116 83864	10k 5% 0.5W
3610	4822 117 10833	10k 1% 0.1W
3611	4822 116 52283	4k7 5% 0.5W
3612	4822 116 52283	4k7 5% 0.5W
3613	4822 116 83883	470Ω 5% 0.5W
3614	4822 116 52283	4k7 5% 0.5W
3615	4822 117 10833	10k 1% 0.1W
3616	4822 117 10833	10k 1% 0.1W
3617	4822 051 10102	1k 5% 0.1W
3618	4822 051 20472	4k7 5% 0.1W
3619	4822 051 20472	4k7 5% 0.1W
3620	4822 051 20472	4k7 5% 0.1W
3621	4822 051 20472	4k7 5% 0.1W
3623	4822 051 20472	4k7 5% 0.1W
3624	4822 051 20472	4k7 5% 0.1W
3625	4822 051 20472	4k7 5% 0.1W
3626	4822 051 20472	4k7 5% 0.1W
3627	4822 051 20472	4k7 5% 0.1W
3628	4822 051 10102	1k 5% 0.1W
3630	4822 116 83864	10k 5% 0.5W
3631	4822 051 20682	6k8 5% 0.1W
3632	4822 117 11503	220Ω 1% 0.1W
3633	4822 051 20472	4k7 5% 0.1W
3634	4822 051 20271	270Ω 5% 0.1W
3635	4822 116 52283	4k7 5% 0.5W
3636	4822 117 10833	10k 1% 0.1W
3637	4822 116 83864	10k 5% 0.5W
3640	4822 051 20473	47k 5% 0.1W
3641	4822 051 20273	27k 5% 0.1W
3642	4822 117 10833	10k 1% 0.1W
3643	4822 051 20104	100k 5% 0.1W
3644	4822 117 11503	220Ω 1% 0.1W
3650	4822 051 20822	8k2 5% 0.1W
3651	4822 117 10833	10k 1% 0.1W
3652	4822 051 20822	8k2 5% 0.1W
3653	4822 051 20122	1k2 5% 0.1W
3660	4822 051 20008	0Ω 5% 0.1W
4xxx	4822 051 10008	0Ω 5% 0.25W

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5000	4822 152 20677	10µH 10%
5378	4822 157 60123	6.8µH 10%
5380	4822 157 60123	6.8µH 10%
5381	4822 157 60123	6.8µH 10%
5382	4822 157 53001	27µH 10%
5383	4822 156 21719	1.5µH 10%
5500	4822 157 51312	68µH 10%
5501	4822 153 20251	18µH 10%
5600	4822 157 60123	6.8µH 10%
5601	4822 152 20677	10µH 10%

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6003	4822 130 80542	BZX84-C33
6302	4822 130 31983	BAT85
6303	4822 130 31983	BAT85
6400	4822 130 82346	LLZ-C27
6401	4822 130 82346	LLZ-C27
6402	4822 130 82346	LLZ-C27
6403	4822 130 82346	LLZ-C27
6404	4822 130 81513	LLZ-C6V8
6405	4822 130 81513	LLZ-C6V8
6406	4822 130 81513	LLZ C6V8
6407	4822 130 81513	LLZ-C6V8
6408	4822 130 81513	LLZ-C6V8
6409	4822 130 81513	LLZ-C6V8
6410	4822 130 81513	LLZ-C6V8
6411	4822 130 81513	LLZ-C6V8
6412	4822 130 81513	LLZ-C6V8
6413	4822 130 81513	LLZ-C6V8
6414	4822 130 31983	BAT85
6415	4822 130 82346	LLZ-C27
6416	4822 130 82346	LLZ-C27
6417	4822 130 82346	LLZ-C27
6418	4822 130 82346	LLZ-C27
6419	4822 130 81513	LLZ-C6V8
6420	4822 130 81513	LLZ-C6V8
6421	4822 130 81513	LLZ-C6V8
6422	4822 130 81513	LLZ-C6V8
6423	4822 130 82346	LLZ-C27
6424	4822 130 82346	LLZ-C27
6425	4822 130 82346	LLZ-C27
6426	4822 130 82346	LLZ-C27
6427	4822 130 82346	LLZ-C27
6428	4822 130 82346	LLZ-C27
6429	4822 130 82346	LLZ-C27
6430	4822 130 82346	LLZ-C27
6431	4822 130 81513	LLZ-C6V8
6432	4822 130 81513	LLZ-C6V8
6433	4822 130 81513	LLZ-C6V8
6434	4822 130 82346	LLZ-C27
6435	4822 130 82346	LLZ-C27
6436	4822 130 82346	LLZ-C27
6437	4822 130 82346	LLZ-C27
6438	4822 130 82346	LLZ-C27
6520	4822 130 80446	LL4148
6521	4822 130 80446	LL4148
6522	4822 130 80446	LL4148
6523	5322 130 31928	BAS16
6526	5322 130 31928	BAS16
6540	4822 130 81513	LLZ-C6V8
6546	5322 130 33671	BZX84-C6V2
6640	4822 130 82334	BAS85
6641	4822 130 81513	LLZ C6V8
6642	4822 130 81513	LLZ C6V8
6643	4822 130 81513	LLZ-C6V8

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7352	4822 209 90952	TDA9144
7352	4822 209 12942	TDA9143
7358	4822 209 12635	TDA4665
7390	5322 130 41982	BC848B
7395	5322 130 41982	BC848B
7396	5322 130 42136	BC848C
7397	5322 130 60508	BC857B
7400	5322 130 41982	BC848B
7401	4822 130 40959	BC547B
7402	4822 130 40959	BC547B
7403	5322 130 41982	BC848B
7404	5322 130 41982	BC848B
7405	4822 130 44568	BC557B
7406	4822 209 12999	TEA6415C
7407	4822 209 10263	HEF4052BP
7408	5322 130 60508	BC857B
7409	5322 130 41982	BC848B
7411	4822 209 90051	TDA8601
7412	5322 130 60508	BC857B
7413	5322 130 41982	BC848B
7415	5322 130 60508	BC857B
7416	5322 130 60508	BC857B
7500	4822 209 90035	TDA4780
7501	4822 130 42131	BF550
7502	5322 130 42136	BC848C
7503	4822 130 42131	BF550
7504	5322 130 42136	BC848C
7505	5322 130 41982	BC848B
7506	5322 130 42136	BC848C
7518	4822 209 73852	PMBT2369
7536	5322 130 60508	BC857B
7538	5322 130 60508	BC857B
7539	5322 130 41982	BC848B
7540	5322 130 60508	BC857B
7580	4822 209 15116	TDA9177
7600	4822 209 13001	TMP47C840N-U641
7601	5322 130 41982	BC848B
7602	5322 130 41982	BC848B
7603	5322 130 41982	BC848B
7640	5322 130 41982	BC848B

IF panel [L]

Various

	4822 265 10433	Pin strip
1100	4822 242 10307	Filter OFWG3956M
1100	4822 242 81436	Filter OFWK3953M
1100	4822 242 81436	Filter OFWK3953M
1101	4822 242 10306	Filter OFWK9463M
1102	4822 242 10308	Filter OWFL9354M
1110	4822 212 10575	IF panel Multi-Europe
1110	4822 212 10576	IF panel Multi-France
1110	4822 212 10577	IF panel Multi-Russian
1160	4822 242 72211	Filter 5.5/5.74 MHz
1160	4822 153 30025	Filter 6.0MHz
1161	4822 242 81978	Filter 4.5MHz
1161	4822 242 72211	Filter 5.5/5.74 MHz

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2100	4822 126 10002	100nF 20% 25V
2101	4822 122 33177	10nF 20% 50V
2102	4822 126 13694	68pF 1% 63V
2102	4822 051 20008	0Ω 55 0.1W
2103	5322 122 31863	330pF 5% 50V
2104	5322 122 31873	2.7pF 5% 100V
2105	5322 122 31873	2.7pF 5% 100V
2109	4822 122 33177	10nF 20% 50V
2111	4822 122 33177	10nF 20% 50V
2112	5322 122 32447	1pF 5% 50V
2115	4822 051 20008	0Ω 55 0.1W
2115	4822 122 33575	220pF 5% 50V
2116	4822 126 13694	68pF 1% 63V
2117	5322 122 31873	2.7pF 5% 100V
2120	4822 126 10002	100nF 20% 25V
2121	4822 126 10002	100nF 20% 25V
2122	4822 126 10002	100nF 20% 25V
2123	4822 122 33177	10nF 20% 50V
2140	4822 122 33177	10nF 20% 50V
2141	4822 126 10002	100nF 20% 25V
2142	4822 126 10002	100nF 20% 25V
2144	4822 124 40242	1µF 20% 63V
2144	4822 124 41576	2.2µF 20% 50V
2145	4822 122 33177	10nF 20% 50V
2150	4822 124 41643	100µF 20% 16V
2165	4822 126 10002	100nF 20% 25V
2166	5322 122 33063	2.2pF 5% 50V
2167	4822 124 41576	2.2µF 20% 50V
2168	4822 124 41576	2.2µF 20% 50V
2170	4822 124 41579	10µF 20% 50V
2171	4822 126 10002	100nF 20% 25V

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3100	4822 117 11449	2k2 1% 0.1W
3104	4822 051 20101	100Ω 5% 0.1W
3104	4822 051 20479	47Ω 5% 0.1W
3106	4822 051 20472	4k7 5% 0.1W
3107	4822 117 10833	10k 1% 0.1W
3108	4822 051 20272	2k7 5% 0.1W
3109	4822 051 10102	1k 2% 0.25W
3121	4822 051 20682	6k8 5% 0.1W
3122	4822 117 10833	10k 1% 0.1W
3124	4822 051 20822	8k2 5% 0.1W
3125	4822 116 83864	10k 5% 0.5W
3126	4822 116 52256	2k2 5% 0.5W
3127	4822 116 52256	2k2 5% 0.5W
3127	4822 116 52283	4k7 5% 0.5W
3128	4822 116 52256	2k2 5% 0.5W
3128	4822 116 52283	4k7 5% 0.5W
3129	4822 116 52257	22k 5% 0.5W
3130	4822 116 52257	22k 5% 0.5W
3131	4822 051 20223	22k 5% 0.1W
3140	4822 101 11192	22k 30% lin
3141	4822 051 20471	470Ω 5% 0.1W
3141	4822 117 11448	180Ω 1% 0.1W
3146	4822 116 52283	4k7 5% 0.5W
3150	4822 116 52213	180Ω 5% 0.5W
3151	4822 116 52226	560Ω 5% 0.5W
3160	4822 117 11448	180Ω 1% 0.1W
3160	4822 117 11503	220Ω 1% 0.1W
3161	4822 051 20008	0Ω 5% 0.1W
3162	4822 117 10833	10k 1% 0.1W
3165	4822 051 20473	47k 5% 0.1W
3166	4822 051 20473	47k 5% 0.1W
3191	4822 051 10102	1k 2% 0.25W
3192	4822 051 10102	1k 2% 0.25W
3199	4822 051 20331	330Ω 5% 0.1W
3199	4822 117 11503	220Ω 1% 0.1W
3199	4822 051 20471	470Ω 5% 0.1W
4xxx	4822 051 20008	0Ω 5% 0.1W

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5100	4822 157 10401	0.33µH 20%
5101	4822 157 10403	Coil trimm
5102	4822 157 10404	Coil trimm
5104	4822 157 53302	1µH 20%
5140	4822 157 53302	1µH 20%
5141	4822 157 53302	1µH 20%
5160	4822 152 20677	10µH 10%
5161	4822 157 60123	6.8µH 10%
5165	4822 157 10402	Coil trimm.

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6100	4822 130 10414	BA792
6101	4822 130 10414	BA792

6110	4822 130 10414	BA792
6111	4822 130 10414	BA792
6112	4822 130 10414	BA792

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7100	4822 209 13003	TDA9811/V3
7110	4822 130 10198	MMUN2214
7120	4822 130 10198	MMUN2214
7121	4822 130 10198	MMUN2214
7122	4822 130 10198	MMUN2214
7123	4822 130 10198	MMUN2214
7124	5322 130 41983	BC858B
7160	4822 130 10198	MMUN2214
7161	5322 130 41983	BC858B
7190	4822 130 10198	MMUN2214
7191	4822 130 10198	MMUN2214

Feature-box 3 [M1]

Various

	4822 532 21513	Spacer 9.5mm
	4822 255 41356	PLCC socket
	4822 267 51433	10P female
1345	4822 212 11143	FBX3 S/P
1345	4822 212 11146	FBX3
1345	4822 212 11198	FBX3 S/L
1345	4822 212 11325	FBX3 S/P VGA
1485	4822 242 72572	Crystal 12.0 MHz
1485	4822 242 82198	Crystal 12MHz

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2375	5322 122 32531	100pF 5% 50V
2376	4822 122 33496	100nF 10% 63V
2377	4822 126 13689	18pF 1% 63V
2378	5322 122 32661	56pF 5% 50V
2379	4822 122 33515	82pF 5% 63V
2380	4822 122 32542	47nF 10% 63V
2381	5322 122 32268	470pF 10% 50V
2385	5322 122 32531	100pF 5% 50V
2386	4822 126 10002	100nF 20% 25V
2387	5322 122 32661	56pF 5% 50V
2388	5322 126 10343	1,8pF 5% 63V
2389	4822 126 10326	180pF 5% 63V
2390	5322 122 32654	22nF 10% 63V
2395	5322 122 32531	100pF 5% 50V
2396	4822 126 10002	100nF 20% 25V
2397	5322 122 32661	56pF 5% 50V
2398	5322 126 10343	1,8pF 5% 63V
2399	4822 126 10326	180pF 5% 63V
2400	5322 122 32654	22nF 10% 63V
2410	4822 124 41715	220µF 20% 6.3V
2410	4822 124 11912	220µF 20% 6.3V
2411	4822 124 41715	220µF 20% 6.3V
2412	5322 122 32654	22nF 10% 63V
2413	5322 122 32654	22nF 10% 63V
2415	5322 122 32654	22nF 10% 63V
2419	4822 124 20678	47µF 50% 10V
2419	4822 124 11911	47µF 20% 16V
2420	4822 126 10002	100nF 20% 25V
2421	5322 122 32654	22nF 10% 63V
2422	4822 124 41643	100µF 20% 16V
2423	4822 124 41643	100µF 20% 16V
2424	5322 122 32654	22nF 10% 63V
2425	5322 122 32654	22nF 10% 63V
2426	4822 124 41715	220µF 20% 6.3V
2430	5322 122 32531	100pF 5% 50V
2433	5322 122 32531	100pF 5% 50V
2435	5322 122 32531	100pF 5% 50V
2440	4822 126 10002	100nF 20% 25V
2441	4822 124 20678	47µF 50% 10V
2445	4822 126 10002	100nF 20% 25V
2446	4822 126 10002	100nF 20% 25V
2447	4822 126 11725	1µF 20% 5V
2448	4822 124 20678	47µF 50% 10V
2448	4822 124 11911	47µF 20% 16V
2449	4822 124 40433	47µF 20% 25V
2450	5322 122 32654	22nF 10% 63V
2451	5322 122 32654	22nF 10% 63V
2452	4822 124 40246	4.7µF 20% 63V
2453	4822 126 10002	100nF 20% 25V
2454	4822 124 20678	47µF 50% 10V
2455	4822 124 41579	10µF 20% 50V
2455	5322 124 21731	10µF 20% 50V
2460	5322 122 32654	22nF 10% 63V
2462	5322 122 32654	22nF 10% 63V
2465	5322 122 32966	39pF 5% 50V
2466	5322 122 32531	100pF 5% 50V
2467	5322 122 32481	15pF 5% 50V
2468	5322 122 32658	22pF 5% 50V
2469	5322 122 33538	150pF 2% 63V
2476	5322 122 32659	33pF 5% 50V
2477	5322 122 32287	4,7pF 5% 50V
2478	5322 122 33861	120pF 10% 50V
2481	5322 122 32659	33pF 5% 50V
2482	5322 122 32287	4,7pF 5% 50V
2483	5322 122 33861	120pF 10% 50V
2485	5322 122 32448	10pF 5% 50V
2486	5322 122 32448	10pF 5% 50V
2490	5322 122 32531	100pF 5% 50V
2492	5322 122 33538	150pF 2% 63V
2493	5322 122 32531	100pF 5% 50V
2505	4822 126 10002	100nF 20% 25V
2508	5322 122 32452	47pF 5% 63V
2509	5322 122 32452	47pF 5% 63V
2545	4822 124 11911	47µF 20% 16V

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3370	4822 051 20101	100Ω 5% 0,1W
3371	4822 051 20101	100Ω 5% 0,1W
3372	4822 051 20101	100Ω 5% 0,1W
3375	4822 051 20332	3k3 5% 0,1W
3376	4822 051 20473	47k 5% 0,1W
3377	4822 051 10102	1k 2% 0,25W
3378	4822 117 11597	510Ω 1% 0,1W
3379	4822 117 11449	2k2 1% 0,1W
3380	4822 051 20681	680Ω 5% 0,1W
3381	4822 051 20751	750Ω 5% 0,1W
3385	4822 051 20332	3k3 5% 0,1W
3386	4822 051 20473	47k 5% 0,1W
3387	4822 117 11503	220Ω 1% 0,1W
3388	4822 117 11597	510Ω 1% 0,1W
3389	4822 117 10361	680Ω 1% 0,1W
3390	4822 051 20681	680Ω 5% 0,1W
3395	4822 051 20332	3k3 5% 0,1W
3396	4822 051 20473	47k 5% 0,1W
3397	4822 117 11595	27Ω 1% 0,1W
3398	4822 117 10845	620Ω 1% 0,1W
3399	4822 117 10361	680Ω 1% 0,1W
3400	4822 051 20681	680Ω 5% 0,1W
3410	4822 116 52176	10Ω 5% 0,5W
3411	4822 117 11448	180Ω 1% 0,1W
3413	4822 051 20271	270Ω 5% 0,1W
3414	4822 051 20562	5k6 5% 0,1W
3422	4822 052 10109	10Ω 5% 0,33W
3430	4822 051 10102	1k 2% 0,25W
3431	4822 051 20472	4k7 5% 0,1W
3432	4822 051 20472	4k7 5% 0,1W
3433	4822 051 20332	3k3 5% 0,1W
3434	4822 051 20101	100Ω 5% 0,1W
3435	4822 051 20332	3k3 5% 0,1W
3436	4822 051 20101	100Ω 5% 0,1W
3450	4822 051 20101	100Ω 5% 0,1W
3451	4822 051 20101	100Ω 5% 0,1W
3452	4822 051 20101	100Ω 5% 0,1W
3453	4822 051 20101	100Ω 5% 0,1W
3460	4822 052 10109	10Ω 5% 0,33W
3461	4822 051 20682	6k8 5% 0,1W
3462	4822 051 20331	330Ω 5% 0,1W
3465	4822 117 11596	390Ω 1% 0,1W
3466	4822 117 11373	100Ω 1% 0,1W
3467	4822 051 20479	47Ω 5% 0,1W
3468	4822 051 20479	47Ω 5% 0,1W
3469	4822 117 11594	200Ω 1% 0,1W
3475	4822 117 11596	390Ω 1% 0,1W
3476	4822 117 11503	220Ω 1% 0,1W
3477	4822 051 20203	20k 5% 0,1W
3480	4822 117 11596	390Ω 1% 0,1W
3481	4822 117 11504	270Ω 1% 0,1W
3482	4822 117 11154	1k 1% 0,1W
3485	4822 051 20104	100k 5% 0,1W
3490	4822 051 20472	4k7 5% 0,1W
3491	4822 117 10833	10k 1% 0,1W
3491	4822 117 11139	1k5 1% 0,1W
3492	4822 051 20472	4k7 5% 0,1W
3493	4822 117 10833	10k 1% 0,1W
3494	4822 051 20471	470Ω 5% 0,1W
3495	4822 051 20479	47Ω 5% 0,1W
3500	4822 051 20331	330Ω 5% 0,1W
3502	4822 051 20472	4k7 5% 0 1W
3503	4822 117 11503	220Ω 1% 0 1W
3504	4822 051 20273	27k 5% 0,1W
3505	4822 117 11449	2k2 1% 0,1W
3506	4822 117 10833	10k 1% 0,1W
3507	4822 051 20272	2k7 5% 0 1W
3508	4822 051 20101	100Ω 5% 0.1W
3509	4822 051 20101	100Ω 5% 0.1W
3510	4822 051 10102	1k 2% 0.25W
3511	4822 051 10102	1k 2% 0.25W
3512	4822 051 20101	100Ω 5% 0.1W
3513	4822 051 20101	100Ω 5% 0.1W
3514	4822 051 20101	100Ω 5% 0.1W
3515	4822 051 20008	0Ω 5% 0.1W
3999	4822 051 20392	3k9 5% 0.1W
4xxx	4822 051 20008	0Ω 5% 0.1W

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5377	4822 157 53303	12µH 10%
5378	4822 153 20251	18µH 10%
5381	4822 157 52333	100µH 10%
5388	4822 157 63316	56µH 10%
5398	4822 157 63316	56µH 10%
5420	4822 157 51216	5,6µH 10%
5421	4822 157 51216	5,6µH 10%
5425	4822 157 60147	2,2µH
5440	4822 157 51216	5,6µH 10%
5445	4822 157 51216	5,6µH 10%
5446	4822 157 51216	5,6µH 10%
5447	4822 157 51216	5,6µH 10%
5453	4822 157 51216	5,6µH 10%
5454	4822 157 51216	5,6µH 10%
5465	4822 158 21719	1,5µH 20%
5466	4822 157 71443	1,8µH 20%
5477	4822 157 60122	4,7µH 10%
5482	4822 157 60122	4,7µH 10%
5490	4822 157 60147	2,2µH
5492	4822 157 60147	2,2µH
5505	4822 157 51216	5,6µH 10%

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6500	4822 130 34167	BZX79-F6V2

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7376	5322 130 42136	BC848C
7380	5322 130 42136	BC848C
7386	5322 130 42136	BC848C
7390	5322 130 42136	BC848C
7396	5322 130 42136	BC848C
7400	5322 130 42136	BC848C
7432	4822 209 73852	PMBT2369
7440	4822 209 90528	TDA8753AN/C1
7441	4822 209 90528	TDA8753AN/C1
7445	4822 209 90021	TMS4C2970-28DT
7446	4822 209 90021	TMS4C2970-28DT
7447	4822 209 90034	SAA4990H/V0
7450	4822 209 33689	SAA4970/V2
7460	4822 209 72042	MC78L05ACP
7461	5322 130 42136	BC848C
7490	4822 209 73852	PMBT2369
7492	4822 209 73852	PMBT2369
7493	4822 130 42513	BC858C
7500	5322 130 42136	BC848C
7504	4822 209 73852	PMBT2369
7505	4822 900 10982	S87C652-5A44
7505	4822 900 10982	S87C652-5A44
7506	4822 130 42513	BC858C

Feature-box 4 [M2]

Various

	4822 532 21513	Spacer 9,5mm
	4822 267 51433	10P female
1345	4822 212 11216	FBX4 S/P
1345	4822 212 11204	FBX4 S/L/P
1345	4822 212 11323	FBX4 S/L/P VGA
1345	4822 212 11208	FBX4 S/P PALplus
1345	4822 212 11207	FBX4 S/L/P PALplus
1345	4822 212 11324	FBX4 S/L/P PALplus VGA
1485	4822 242 82198	Crystal 12 MHz
1485	4822 242 72572	Crystal 12 MHz

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2373	4822 126 11725	1µF 20% 5V
2374	4822 126 11725	1µF 20% 5V
2375	5322 122 32531	100pF 5% 50V
2376	5322 122 32268	470pF 10% 50V
2377	4822 126 13689	18pF 1% 63V
2378	5322 122 32661	56pF 5% 50V
2379	5322 122 32531	100pF 5% 50V
2380	4822 126 11725	1µF 20% 5V
2381	4822 126 11725	1µF 20% 5V
2385	5322 122 32531	100pF 5% 50V
2386	4822 126 10002	100nF 20% 25V
2387	5322 122 32661	56pF 5% 50V
2388	5322 126 10343	1,8pF 5% 63V
2389	4822 126 10326	180pF 5% 63V
2390	5322 122 32654	22nF 10% 63V
2395	5322 122 32531	100pF 5% 50V
2396	4822 126 10002	100nF 20% 25V
2397	5322 122 32661	56pF 5% 50V
2398	5322 126 10343	1,8pF 5% 63V
2399	4822 126 10326	180pF 5% 63V
2400	5322 122 32654	22nF 10% 63V
2410	4822 124 11912	220µF 20% 6.3V
2411	4822 124 11912	220µF 20% 6.3V
2412	5322 122 32654	22nF 10% 63V
2413	5322 122 32654	22nF 10% 63V
2415	5322 122 32654	22nF 10% 63V
2419	5322 121 10472	47µF 20% 25V
2420	4822 126 10002	100nF 20% 25V
2421	5322 122 32654	22nF 10% 63V
2422	4822 124 41643	100µF 20% 16V
2423	4822 124 80499	100µF 20% 16V
2424	5322 122 32654	22nF 10% 63V
2425	5322 122 32654	22nF 10% 63V
2426	4822 124 41715	220µF 20% 6.3V
2430	5322 122 32531	100pF 5% 50V
2433	5322 122 32531	100pF 5% 50V
2435	5322 122 32531	100pF 5% 50V
2440	4822 126 10002	100nF 20% 25V
2441	5322 121 10472	47µF 20% 25V
2442	4822 126 11725	1µF 20% 5V
2443	4822 126 11725	1µF 20% 5V
2444	4822 126 11725	1µF 20% 5V
2445	4822 126 11725	1µF 20% 5V
2446	4822 126 11725	1µF 20% 5V
2447	4822 126 11725	1µF 20% 5V
2448	4822 126 11725	1µF 20% 5V
2450	5322 122 32654	22nF 10% 63V
2451	5322 122 32654	22nF 10% 63V
2452	4822 124 11946	22µF 20% 16V
2453	4822 126 10002	100nF 20% 25V
2454	4822 124 11911	47µF 20% 16V
2455	4822 124 11947	10µF 20% 16V
2460	5322 122 32654	22nF 10% 63V
2462	5322 122 32654	22nF 10% 63V
2465	5322 122 32966	39pF 5% 50V
2466	5322 122 32531	100pF 5% 50V
2467	5322 122 32481	15pF 5% 50V
2468	5322 122 32966	39pF 5% 50V
2469	5322 122 33861	120pF 10% 50V
2476	5322 122 32659	33pF 5% 50V
2477	5322 122 32287	4,7pF 5% 50V
2478	5322 122 33861	120pF 10% 50V
2481	5322 122 32659	33pF 5% 50V
2482	5322 122 32287	4,7pF 5% 50V
2483	5322 122 33861	120pF 10% 50V
2485	5322 122 32448	10pF 5% 50V
2486	5322 122 32448	10pF 5% 50V
2490	5322 122 32531	100pF 5% 50V
2492	5322 122 33538	150pF 2% 63V
2493	5322 122 32531	100pF 5% 50V
2505	4822 126 10002	100nF 20% 25V
2508	5322 122 32452	47pF 5% 63V
2509	5322 122 32452	47pF 5% 63V

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3375	4822 117 10833	10k 1% 0,1W
3376	4822 051 20751	750Ω 5% 0,1W
3377	4822 051 10102	1k 2% 0,25W
3378	4822 117 11597	510Ω 1% 0,1W
3379	4822 117 11376	3k6 1% 0,1W
3380	4822 051 20681	680Ω 5% 0,1W
3381	4822 117 11503	220Ω 1% 0,1W
3382	4822 051 20101	100Ω 5% 0,1W
3383	4822 051 20101	100Ω 5% 0,1W
3384	4822 051 20101	100Ω 5% 0,1W
3385	4822 051 20332	3k3 5% 0,1W
3386	4822 051 20473	47k 5% 0,1W
3387	4822 117 11503	220Ω 1% 0,1W
3388	4822 117 11597	510Ω 1% 0,1W
3389	4822 117 10361	680Ω 1% 0,1W
3390	4822 051 20681	680Ω 5% 0,1W
3391	4822 117 11503	220Ω 1% 0,1W
3392	4822 051 20101	100Ω 5% 0,1W
3393	4822 051 20101	100Ω 5% 0,1W
3395	4822 051 20332	3k3 5% 0,1W
3396	4822 051 20473	47k 5% 0,1W
3397	4822 117 11595	27Ω 1% 0,1W
3398	4822 117 10845	620Ω 1% 0,1W
3399	4822 117 10361	680Ω 1% 0,1W
3400	4822 051 20681	680Ω 5% 0,1W
3401	4822 117 11503	220Ω 1% 0,1W
3402	4822 051 20101	100Ω 5% 0,1W
3410	4822 116 52176	10Ω 5% 0,5W
3411	4822 117 11448	180Ω 1% 0,1W
3413	4822 051 20271	270Ω 5% 0 1W
3414	4822 051 20562	5k6 5% 0,1W
3420	4822 051 20223	22k 5% 0,1W
3422	4822 052 10109	10Ω 5% 0,33W
3430	4822 051 10102	1k 2% 0,25W
3431	4822 051 20472	4k7 5% 0,1W
3432	4822 051 20472	4k7 5% 0.1W
3433	4822 051 20332	3k3 5% 0.1W
3434	4822 051 20101	100Ω 5% 0.1W
3435	4822 051 20332	3k3 5% 0.1W
3436	4822 051 20101	100Ω 5% 0.1W
3440	4822 051 20223	22k 5% 0.1W
3441	4822 051 20223	22k 5% 0.1W
3442	4822 051 20223	22k 5% 0.1W
3443	4822 051 20223	22k 5% 0.1W
3444	4822 051 20223	22k 5% 0.1W
3445	4822 051 20223	22k 5% 0.1W
3446	4822 051 10008	0Ω 5% 0.25W
3447	4822 051 10008	0Ω 5% 0.25W
3448	4822 051 10151	150Ω 2% 0.25W
3449	4822 117 11503	220Ω 1% 0.1W
3450	4822 051 20229	22Ω 5% 0.1W
3450	4822 051 20759	75Ω 5% 0.1W
3451	4822 051 20229	22Ω 5% 0.1W
3452	4822 051 20101	100Ω 5% 0.1W
3453	4822 051 20101	100Ω 5% 0.1W
3460	4822 052 10109	10Ω 5% 0.33W
3460	4822 052 10229	22Ω 5% 0.33W
3461	4822 051 20682	6k8 5% 0.1W
3462	4822 051 20331	330Ω 5% 0.1W
3465	4822 117 11596	390Ω 1% 0.1W
3466	4822 117 11499	120Ω 1% 0.1W
3467	4822 051 20479	47Ω 5% 0.1W
3468	4822 051 20109	10Ω 5% 0.1W
3469	4822 117 11448	180Ω 1% 0.1W
3471	4822 117 12149	4Ω7 1% 0.1W
3475	4822 117 11596	390Ω 1% 0.1W
3476	4822 117 11503	220Ω 1% 0.1W
3477	4822 051 20203	20k 5% 0.1W
3480	4822 117 11596	390Ω 1% 0.1W
3481	4822 117 11504	270Ω 1% 0.1W
3482	4822 117 11154	1k 1% 0.1W
3485	4822 051 20104	100k 55 0.1W
3490	4822 051 20472	4k7 5% 0.1W
3491	4822 117 10833	10k 1% 0.1W
3492	4822 051 20472	4k7 5% 0.1W
3493	4822 117 10833	10k 1% 0.1W
3494	4822 051 20471	470Ω 5% 0.1W
3495	4822 051 20479	47Ω 5% 0.1W
3499	4822 051 10102	1k 2% 0.25W
3499	4822 117 11139	1k5 1% 0.1W
3499	4822 051 20332	3k3 5% 0.1W
3499	4822 051 20472	4k7 5% 0.1W
3500	4822 051 20331	330Ω 5% 0.1W
3502	4822 051 20472	4k7 5% 0.1W
3503	4822 117 11503	220Ω 1% 0.1W
3504	4822 051 20273	27k 5% 0.1W
3505	4822 117 11449	2k2 1% 0.1W
3506	4822 117 10833	10k 1% 0.1W
3507	4822 051 20272	2k7 5% 0.1W
3508	4822 051 20101	100Ω 5% 0.1W
3509	4822 051 20101	100Ω 5% 0.1W
3510	4822 117 10833	10k 1% 0.1W
3511	4822 117 10833	10k 1% 0.1W

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5377	4822 157 53303	12µH 10%
5378	4822 153 20251	18µH 10%
5379	4822 157 52333	100µH 10%
5388	4822 157 63316	56µH 10%
5398	4822 157 63316	56µH 10%
5420	4822 157 53634	5.6µH 10%
5421	4822 157 53634	5.6µH 10%
5425	4822 157 60147	2,2µH
5440	4822 157 53634	5,6µH 10%
5445	4822 157 53634	5,6µH 10%
5446	4822 157 53634	5.6µH 10%
5447	4822 157 60147	2,2µH
5453	4822 157 60147	2,2µH
5454	4822 157 53634	5,6µH 10%
5465	4822 156 21719	1,5µH 20%
5466	4822 157 62552	2.2µH 20%
5477	4822 157 60122	4.7µH 10%
5482	4822 157 60122	4.7µH 10%
5490	4822 157 60147	2.2µH
5492	4822 157 60147	2.2µH
5505	4822 157 53634	5.6µH 10%

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6367	4822 130 30621	1N4148
6500	4822 130 34167	BZX79-F6V2

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7376	5322 130 42136	BC848C
7380	5322 130 42136	BC848C
7386	5322 130 42136	BC848C
7390	5322 130 42136	BC848C
7396	5322 130 42136	BC848C
7400	5322 130 42136	BC848C
7432	4822 209 73852	PMBT2369
7440	4822 209 90528	TDA8753AN
7445	4822 209 15117	TMS4C2972
7446	4822 209 15117	TMS4C2972
7447	4822 209 12876	SAA4991WP
7450	4822 209 33689	SAA4970T
7460	4822 209 90927	L78L05ACD
7461	5322 130 42136	BC848C
7490	4822 209 73852	PMBT2369
7492	4822 209 73852	PMBT2369
7493	4822 130 42513	BC858C
7500	5322 130 42136	BC848C
7504	4822 209 73852	PMBT2369
7505	4822 209 15401	Software FBX4 S/L/P
7505	4822 209 15398	Software FBX4 S/L/P PALplus
7506	4822 130 42513	BC858C

A/I panel [N]

Various

	4822 265 61299	40P male h 2.54
	4822 265 61296	IC socket 40P
1367	4822 212 11202	AI S/L
1367	4822 212 11161	AI S/P
1367	4822 212 11209	AI S/P PALplus
1367	4822 212 11203	AI S/L/P
1367	4822 212 11205	AI S/L/P PALplus

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2006	4822 126 10002	100nF 20% 25V
2008	4822 126 10002	100nF 20% 25V
2009	4822 126 10002	100nF 20% 25V
2010	4822 126 10002	100nF 20% 25V

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3004	4822 117 10833	10k 1% 0,1W
3005	4822 117 10833	10k 1% 0,1W
3006	4822 051 20272	2k7 55 0,1W

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7006	4822 209 15399	SAA4946H/V1
7009	4822 209 15339	S87C52/20 QFP44
7010	4822 209 90966	SAA4995WP

PALplus panel [N2]

Various

	4822 265 61299	40P male h 2.54
1367	4822 212 11206	AI panel + PALplus S/L/P
1367	4822 212 11211	AI panel + PALplus S/P

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2000	4822 126 10002	100nF 20% 25V
2001	4822 126 10002	100nF 20% 25V
2002	4822 126 10002	100nF 20% 25V
2003	4822 126 10002	100nF 20% 25V
2004	4822 126 10002	100nF 20% 25V
2005	4822 126 10002	100nF 20% 25V
2006	4822 126 10002	100nF 20% 25V
2012	4822 126 10002	100nF 20% 25V
2015	4822 126 10002	100nF 20% 25V
2016	4822 126 10002	100nF 20% 25V

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3001	4822 051 20122	1k2 5% 0.1W
3002	4822 051 20101	100Ω 5% 0.1W
3003	4822 051 20101	100Ω 5% 0.1W
3004	4822 051 20229	22Ω 5% 0.1W
3005	4822 051 20101	100Ω 5% 0.1W
3006	4822 051 20101	100Ω 5% 0.1W
3007	4822 051 20229	22Ω 5% 0.1W
3008	4822 051 20101	100Ω 5% 0.1W
3009	4822 117 10833	10k 1% 0.1W

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5000	4822 051 10008	0Ω 55 0.25W
5001	4822 051 10008	0Ω 55 0.25W
5003	4822 051 10008	0Ω 55 0.25W
5004	4822 051 10008	0Ω 55 0.25W
5005	4822 051 10008	0Ω 55 0.25W
5100	4822 157 71592	1.2µH 10%

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7000	4822 209 15117	TMS4C2972
7001	4822 209 91141	SAA4996H
7002	4822 209 15117	TMS4C2972
7003	4822 209 15117	TMS4C2972
7004	4822 209 15117	TMS4C2972
7005	4822 209 91142	SAA4997H

Audio module [O] [P2]

Various

	4822 265 31247	3P male v 1.25
	4822 265 31245	4P male v 2.5
	4822 265 10419	12P male F-PIN
	4822 265 10421	19P male F-PIN
	4822 267 10575	16P male v 2.54
	4822 265 31251	5P male v 1.25 gy
	4822 265 31248	3P male v 1.25
	4822 265 31249	5P male v 2.5 bl
1120	4822 212 10684	Audio module dolby
1120	4822 212 11213	Audio module cordless dolby FDS
1120	4822 212 11214	Audio module dolby FDS
1120	4822 212 32359	Audio module no dolby
1350	4822 242 10434	Crystal 18.432 MHz
1600	4822 071 51001	Fuse 0,1A

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2340	4822 126 13473	220nF 20% 50V
2341	4822 126 13473	220nF 20% 50V
2342	4822 126 13473	220nF 20% 50V
2343	4822 126 13473	220nF 20% 50V
2350	4822 126 10002	100nF 20% 25V
2352	4822 124 41579	10µF 20% 50V
2353	4822 124 41579	10µF 20% 50V
2354	4822 124 41579	10µF 20% 50V
2355	4822 124 41579	10µF 20% 50V
2356	4822 124 41579	10µF 20% 50V
2357	4822 124 41579	10µF 20% 50V
2358	4822 124 41579	10µF 20% 50V
2359	4822 124 41579	10µF 20% 50V
2360	4822 124 41579	10µF 20% 50V
2361	4822 124 41579	10µF 20% 50V
2362	4822 124 41579	10µF 20% 50V
2363	4822 124 41579	10µF 20% 50V
2364	4822 124 40769	4,7µF 20% 100V
2365	4822 124 41579	10µF 20% 50V
2366	4822 124 40255	100µF 20% 63V
2367	4822 124 41579	10µF 20% 50V
2368	4822 124 41579	10µF 20% 50V
2369	4822 121 51252	470nF 5% 63V
2370	4822 121 51252	470nF 5% 63V
2372	4822 126 13805	68nF 10% 16V
2373	5322 126 10223	4.7nF 10% 63V
2374	5322 126 10794	220pF 5% 63V
2375	5322 122 34099	470pF 10% 63V
2376	5322 122 32531	100pF 5% 50V
2377	4822 126 13805	68nF 10% 16V
2378	5322 126 10223	4,7nF 10% 63V
2379	5322 126 10794	220pF 5% 63V
2380	5322 122 34099	470pF 10% 63V
2381	5322 122 32531	100pF 5% 50V
2382	5322 122 34123	1nF 10% 50V
2383	5322 122 34123	1nF 10% 50V
2384	4822 121 51252	470nF 5% 63V
2385	4822 121 51252	470nF 5% 63V
2386	5322 122 34123	1nF 10% 50V
2387	5322 122 34123	1nF 10% 50V
2388	5322 122 34123	1nF 10% 50V
2389	5322 122 34123	1nF 10% 50V
2390	5322 122 34123	1nF 10% 50V
2391	4822 126 10002	100nF 20% 25V
2392	5322 122 32286	3.3pF 5% 50V
2393	5322 122 32286	3.3pF 5% 50V
2394	4822 126 10002	100nF 20% 25V
2395	5322 122 34123	1nF 10% 50V
2396	4822 122 33172	390pF 5% 50V
2397	4822 122 33172	390pF 5% 50V
2398	4822 126 10002	100nF 20% 25V
2400	5322 122 32452	47pF 5% 63V
2401	4822 126 10002	100nF 20% 25V
2402	5322 122 32268	470pF 10% 50V
2403	5322 122 32268	470pF 10% 50V
2404	4822 121 51252	470nF 5% 63V
2405	5322 122 32658	22pF 5% 50V
2408	4822 126 10002	100nF 20% 25V
2413	4822 124 41596	22µF 20% 50V
2415	4822 124 41596	22µF 20% 50V
2422	4822 124 41584	100µF 20% 10V
2425	4822 124 41596	22µF 20% 50V
2427	4822 124 41596	22µF 20% 50V
2432	4822 124 41584	100µF 20% 10V
2436	5322 122 34123	1nF 10% 50V
2436	5322 126 10511	1nF 5% 50V
2437	5322 122 34123	1nF 10% 50V
2437	5322 126 10511	1nF 5% 50V
2438	5322 122 34123	1nF 10% 50V
2438	5322 126 10511	1nF 5% 50V
2446	4822 126 13869	470nF 20% 16V
2447	4822 126 13869	470nF 20% 16V
2448	5322 122 34123	1nF 10% 50V
2448	5322 126 10511	1nF 5% 50V
2449	5322 122 34123	1nF 10% 50V
2449	5322 126 10511	1nF 5% 50V
2450	5322 122 31946	27pF 5% 63V
2452	5322 126 10223	4,7nF 10% 63V
2453	5322 126 10223	4,7nF 10% 63V
2454	5322 126 10223	4,7nF 10% 63V
2455	5322 126 10223	4,7nF 10% 63V
2487	4822 121 51252	470nF 5% 63V
2488	4822 121 51252	470nF 5% 63V
2586	5322 121 42661	330nF 5% 63V
2587	5322 121 42661	330nF 5% 63V
2588	5322 121 42661	330nF 5% 63V
2589	5322 121 42661	330nF 5% 63V
2590	4822 122 33342	33nF 10% 63V
2591	5322 126 10223	4,7nF 10% 63V
2592	4822 126 10002	100nF 20% 25V
2593	4822 124 41584	100µF 20% 10V
2594	5322 126 10223	4,7nF 10% 63V
2595	4822 122 33342	33nF 10% 63V
2596	5322 122 32452	47pF 5% 63V
2600	5322 122 32452	47pF 5% 63V
2601	4822 126 13644	47pF 5% 63V
2602	4822 122 33177	10nF 20% 50V
2604	4822 126 10002	100nF 20% 25V
2607	4822 124 41579	10µF 20% 50V
2618	4822 122 33891	3,3nF 10% 63V
2619	4822 126 10002	100nF 20% 25V
2620	4822 126 10002	100nF 20% 25V
2621	4822 122 32614	1,2nF 10% 50V
2622	4822 122 32541	27nF 10% 63V
2623	4822 122 33891	3,3nF 10% 63V
2624	4822 126 10002	100nF 20% 25V
2625	4822 122 33893	18nF 10% 63V
2626	4822 122 32614	1,2nF 10% 50V
2627	4822 124 41579	10µF 20% 50V
2628	4822 124 41579	10µF 20% 50V
2629	5322 122 31863	330pF 5% 50V
2630	5322 122 31863	330pF 5% 50V
2660	4822 126 13482	470nF 20% 16V
2661	4822 126 13482	470nF 20% 16V

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3356	4822 051 20331	330Ω 5% 0.1W
3357	4822 051 20122	1k2 5% 0 1W
3358	4822 051 20471	470Ω 5% 0.1W
3359	4822 051 20473	47k 5% 0.1W
3360	4822 116 83884	47k 5% 0.5W
3361	4822 116 52283	4k7 5% 0.5W
3362	4822 051 20473	47k 5% 0.1W
3363	4822 117 11449	2k2 1% 0.1W
3364	4822 051 20472	4k7 5% 0.1W
3365	4822 051 20473	47k 5% 0.1W
3366	4822 051 20333	33k 5% 0.1W
3367	4822 051 20473	47k 5% 0.1W
3368	4822 051 20331	330Ω 5% 0.1W
3369	4822 051 20122	1k2 5% 0.1W
3370	4822 051 20471	470Ω 5% 0.1W
3371	4822 051 20473	47k 5% 0.1W
3372	4822 116 83884	47k 5% 0.5W
3373	4822 116 52283	4k7 5% 0.5W
3374	4822 051 20473	47k 5% 0.1W
3375	4822 117 11449	2k2 1% 0.1W
3376	4822 051 20472	4k7 5% 0.1W
3377	4822 051 20473	47k 5% 0.1W
3378	4822 051 20333	33k 5% 0.1W
3379	4822 051 20473	47k 5% 0.1W
3380	4822 116 52175	100Ω 5% 0.5W
3381	4822 116 52175	100Ω 5% 0.5W
3382	4822 051 20332	3k3 5% 0.1W
3383	4822 051 20332	3k3 5% 0.1W
3384	4822 051 20473	47k 5% 0.1W
3385	4822 051 20334	330k 5% 0.1W

3386	4822 051 20334	330k 5% 0,1W
3387	4822 051 20332	3k3 5% 0,1W
3388	4822 051 20334	330k 5% 0.1W
3389	4822 051 20332	3k3 5% 0.1W
3390	4822 116 52272	330k 5% 0.5W
3391	4822 051 20473	47k 5% 0.1W
3391	4822 117 11139	1k5 1% 0.1W
3391	4822 117 11449	2k2 1% 0.1W
3395	4822 051 20008	0Ω 5% 0.1W
3413	4822 117 10833	10k 1% 0.1W
3414	4822 051 20822	8k2 5% 0.1W
3415	4822 051 20473	47k 5% 0.1W
3416	4822 051 10102	1k 2% 0.25W
3420	4822 051 20563	56k 5% 0.1W
3421	4822 051 20683	68k 5% 0.1W
3422	4822 116 52199	68Ω 5% 0.5W
3425	4822 117 10833	10k 1% 0.1W
3426	4822 051 20822	8k2 5% 0.1W
3427	4822 051 20473	47k 5% 0.1W
3428	4822 051 10102	1k 2% 0.25W
3430	4822 051 20563	56k 5% 0.1W
3431	4822 051 20683	68k 5% 0.1W
3432	4822 116 52199	68Ω 5% 0.5W
3433	4822 051 20331	330Ω 5% 0.1W
3441	4822 117 10833	10k 1% 0.1W
3442	4822 117 10833	10k 1% 0.1W
3443	4822 051 20332	3k3 5% 0.1W
3444	4822 051 20332	3k3 5% 0.1W
3589	4822 116 52175	100Ω 5% 0.5W
3590	4822 116 52175	100Ω 5% 0.5W
3602	4822 051 20104	100k 5% 0.1W
3605	4822 116 52175	100Ω 5% 0.5W
3606	4822 116 52175	100Ω 5% 0.5W
3610	4822 117 10833	10k 1% 0.1W
3613	4822 051 20008	0Ω 5% 0.1W
3614	4822 051 20008	0Ω 5% 0.1W
3615	4822 051 20008	0Ω 5% 0.1W
3616	4822 051 20008	0Ω 5% 0.1W
3617	4822 117 11449	2k2 1% 0.1W
3618	4822 051 20392	3k9 5% 0.1W
3619	4822 051 20272	2k7 5% 0.1W
3620	4822 051 20182	1k8 5% 0.1W
3621	4822 117 11449	2k2 1% 0.1W
3622	4822 051 20392	3k9 5% 0.1W
3623	4822 051 20272	2k7 5% 0.1W
3624	4822 051 20182	1k8 5% 0.1W
3625	4822 117 10833	10k 1% 0.1W
3626	4822 051 20153	15k 5% 0.1W
3627	4822 117 11503	220Ω 1% 0.1W
3628	4822 117 11503	220Ω 1% 0.1W
3629	4822 051 20473	47k 5% 0.1W
3631	4822 051 10102	1k 2% 0.25W
3632	4822 051 10102	1k 2% 0.25W
3634	4822 051 10102	1k 2% 0.25W
3635	4822 051 10102	1k 2% 0.25W

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5350	4822 157 53139	4.7µH 10%
5351	4822 157 53139	4.7µH 10%
5352	4822 157 53139	4.7µH 10%
5353	4822 157 53139	4.7µH 10%
5602	4822 157 53139	4.7µH 10%
5604	4822 157 53139	4.7µH 10%

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6380	4822 130 82583	BZV55-C9V1
6381	4822 130 82583	BZV55-C9V1
6382	4822 130 82583	BZV55-C9V1
6384▲	4822 130 30621	1N4148
6385	4822 130 34488	BZX79-F12
6386	4822 130 82583	BZV55-C9V1
6387	4822 130 82583	BZV55-C9V1
6388	4822 130 82583	BZV55-C9V1
6389	4822 130 82583	BZV55-C9V1
6390	4822 130 82583	LLZ-C9V1
6391	4822 130 82583	LLZ-C9V1
6392	4822 130 82583	LLZ-C9V1

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7350	4822 209 72042	MC78L05ACP
7350	4822 209 83163	LM833N
7350	4822 209 90008	L78MXX
7351	4822 209 83163	LM833N
7352	5322 209 10576	HEF4053BP
7353	4822 209 13607	MSP3410B-PS-F7
7353	4822 209 14894	MSP3410B-F7
7382	5322 130 41982	BC848B
7383	5322 130 41982	BC848B
7387	5322 130 41982	BC848B
7389	5322 130 41982	BC848B
7415	5322 130 41982	BC848B
7420	5322 130 41982	BC848B
7421	5322 130 41983	BC858B
7421	5322 130 60508	BC857B
7427	5322 130 41982	BC848B
7430	5322 130 41982	BC848B
7431	5322 130 41983	BC858B
7431	5322 130 60508	BC857B
7432	5322 130 41982	BC848B
7433	5322 130 41982	BC848B
7590	4822 209 33293	TDA9860
7600	4822 209 13606	SAA7710T/N103
7610	4822 209 13605	TDA1387T/N1
7620	4822 209 30095	LM833D
7640	4822 209 30095	LM833D
7650	5322 209 11102	HEF4052BT
7660	5322 209 11102	HEF4052BT

Combfilter [Q]

Various

	4822 265 10422	9P male 2.50 F-PIN
1340	4822 212 10316	Combfilter panel

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2400	4822 126 10002	100nF 20% 25V
2401	4822 126 10002	100nF 20% 25V
2402	4822 126 10002	100nF 20% 25V
2403	4822 126 10002	100nF 20% 25V
2404	4822 126 10002	100nF 20% 25V
2405	4822 126 10002	100nF 20% 25V
2406	4822 126 10002	100nF 20% 25V
2407	4822 126 10002	100nF 20% 25V
2413	5322 122 32531	100pF 5% 50V
2414	4822 126 10002	100nF 20% 25V
2415	4822 124 80283	100µF 6.3V
2416	4822 124 80283	100µF 6.3V
2417	4822 124 80283	100µF 6.3V

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3402	4822 117 11959	0Ω 5% 0.1W
3421	4822 117 10833	10k 1% 0.1W
3422	4822 117 10353	150Ω 1% 0.1W
3423	4822 051 20479	47Ω 5% 0.1W

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5400	4822 152 20677	10µH 10%
5401	4822 152 20677	10µH 10%
5402	4822 152 20677	10µH 10%
5403	4822 157 71878	Ferrite bead
5405	4822 157 71878	Ferrite bead

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7400	4822 209 12998	SAA4961/V2/S1

PIP interface panel [R]

Various

	4822 265 10787	11P ED 1.25 grey
	4822 265 31251	5P ED 1.25 grey
	4822 265 10788	11P ED 1.25 black
	4822 265 41466	10P RFK2 2.5
	4822 265 31252	4P
1034	4822 212 11017	PIP interface panel

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3401	4822 051 20101	100Ω 5% 0.1W
3402	4822 117 11503	220Ω 1% 0.1W

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7401	5322 130 41982	BC848B

PIP panel [S]

Various

	4822 267 51433	10P
	4822 267 41205	4P
	4822 265 31251	5P male v 1.25
1023	4822 212 10681	PIP module
1750	4822 242 81995	Crystal 3.579545 MHz
1765	4822 242 81996	Crystal 4.433619 MHz
1788	4822 242 81966	Crystal 21.05915 MHz

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2759	4822 126 13473	220nF 20% 50V
2760	4822 126 13869	470nF 20% 16V
2761	4822 124 40433	47µF 20% 25V
2762	4822 126 10002	100nF 20% 25V
2766	4822 124 41643	100µF 20% 16V
2767	4822 124 40756	1µF 20% 100V
2770	4822 124 40433	47µF 20% 25V
2772	4822 124 40433	47µF 20% 25V
2778	4822 126 10002	100nF 20% 25V
2780	4822 126 10002	100nF 20% 25V
2781	4822 126 13473	220nF 20% 50V
2782	4822 126 13473	220nF 20% 50V
2784	4822 126 13473	220nF 20% 50V
2786	4822 126 10002	100nF 20% 25V
2787	5322 122 31946	27pF 5% 63V
2788	4822 126 10002	100nF 20% 25V
2789	5322 122 31946	27pF 5% 63V
2790	5322 122 32654	22nF 10% 63V
2792	4822 126 10002	100nF 20% 25V
2794	4822 126 12944	47nF 10% 50V
2796	4822 126 12944	47nF 10% 50V
2798	4822 126 10002	100nF 20% 25V
2800	4822 122 33219	1,8nF 10% 50V
2802	5322 122 32531	100pF 5% 50V
2810	4822 126 13473	220nF 20% 50V
2812	4822 126 10002	100nF 20% 25V
2816	4822 126 10002	100nF 20% 25V
2821	5322 122 32287	4,7pF 5% 50V
2823	5322 122 32287	4,7pF 5% 50V
2825	5322 122 32287	4,7pF 5% 50V
2828	4822 126 12944	47nF 10% 50V
2830	4822 126 12944	47nF 10% 50V
2832	4822 126 12944	47nF 10% 50V
2846	4822 126 10002	100nF 20% 25V
2848	5322 126 10223	4,7nF 10% 63V
2850	5322 126 10223	4,7nF 10% 63V
2852	4822 122 33575	220pF 5% 50V
2856	4822 122 33575	220pF 5% 50V
2863	4822 122 32614	1.2nF 10% 50V
2867	4822 126 10002	100nF 20% 25V
2869	4822 122 32535	680pF 10% 63V
2874	5322 122 34123	1nF 10% 50V
2890	5322 122 32448	10pF 5% 50V

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3755	4822 117 11503	220Ω 1% 0.1W
3762	4822 117 11503	220Ω 1% 0.1W
3764	4822 117 11503	220Ω 1% 0.1W
3766	4822 117 11503	220Ω 1% 0.1W
3800	4822 117 11448	180Ω 1% 0,1W
3802	4822 117 11503	220Ω 1% 0.1W
3804	4822 051 20391	390Ω 5% 0.1W
3806	4822 117 11503	220Ω 1% 0.1W
3820	4822 051 20104	100k 5% 0,1W
3821	4822 117 10361	680Ω 1% 0.1W
3822	4822 051 20472	4k7 5% 0,1W
3823	4822 117 10361	680Ω 1% 0,1W
3824	4822 051 20681	680Ω 5% 0,1W
3825	4822 117 10361	680Ω 1% 0,1W
3826	4822 116 52283	4k7 5% 0.5W
3830	4822 051 20273	27k 5% 0,1W
3858	4822 117 11503	220Ω 1% 0.1W
3859	4822 051 20829	82Ω 5% 0,1W
3863	4822 051 20471	470Ω 5% 0,1W
3864	4822 117 11503	220Ω 1% 0.1W
3869	4822 051 20391	390Ω 5% 0.1W
3870	4822 116 52175	100Ω 5% 0.5W
3872	4822 116 52175	100Ω 5% 0.5W
3873	4822 117 11448	180Ω 1% 0,1W
3874	4822 051 20682	6k8 5% 0,1W
3879	4822 051 10102	1k 2% 0,25W
3882	4822 051 20331	330Ω 5% 0,1W
3884	4822 051 20331	330Ω 5% 0,1W
3886	4822 051 20331	330Ω 5% 0,1W
3890	4822 051 10102	1k 2% 0.25W
3891	4822 116 83883	470Ω 5% 0.5W
3894	4822 051 10102	1k 2% 0.25W
3906	4822 052 10229	22Ω 5% 0.33W
3914	4822 051 20822	8k2 5% 0.1W
3916	4822 051 20822	8k2 5% 0,1W
3999	4822 051 20399	39Ω 5% 0.1W
4xxx	4822 051 10008	0Ω 5% 0.25W
9632	4822 116 52175	100E 5% 0.5W
9633	4822 116 52175	100E 5% 0.5W
9634	4822 116 52175	100E 5% 0.5W

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5754	4822 157 60122	4.7µH 10%
5756	4822 157 60122	4.7µH 10%
5757	4822 157 60122	4.7µH 10%
5760	4822 157 60122	4.7µH 10%
5762	4822 157 60122	4.7µH 10%

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6754	4822 130 30621	1N4148
6756	4822 130 30621	1N4148
6758	4822 130 30621	1N4148

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7750	4822 209 90031	TDA8310
7751	4822 209 90036	TDA8395T
7762	5322 130 41983	BC858B
7764	5322 130 41983	BC858B
7766	5322 130 41983	BC858B
7788	4822 209 90026	SDA9288X
7800	5322 130 41982	BC848B
7828	5322 130 41982	BC848B
7858	5322 130 41982	BC848B
7864	5322 130 41982	BC848B

Mains switch panels [T]/[U]

Various

	4822 256 91766	Led holder
▲	4822 265 30389	2P male
▲	4822 276 13592	Mains switch FL6
	4822 265 41462	7P male 1.25
	4822 265 10423	3P male
	4822 212 10607	Mains switch panel FL6A [T]
	4822 212 10562	Mains switch panel FL6B [U]
1600	4822 130 91478	IR receiver TFMK5360D FL6A
1600	4822 212 30842	IR receiver TFMS5360 FL6B

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2601	4822 124 11485	100µF 20% 16V
2604	4822 124 11486	220µF 20% 16V

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3522▲	4822 116 21217	VDR 1mA/423V 800V
3523	4822 053 21475	4M7 5% 0,5W
3600	4822 116 52175	100Ω 5% 0,5W
3601	4822 116 52175	100Ω 5% 0,5W
3602	4822 116 52213	180Ω 5% 0,5W
3604	4822 116 52175	100Ω 5% 0,5W
3605	4822 116 52175	100Ω 5% 0,5W
3611	4822 116 52175	100Ω 5% 0,5W
3613▲	4822 052 10109	10Ω 5% 0,33W

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6600	4822 130 34174	BZX79-C4V7
6601	4822 209 72895	TLUV5300

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7610	5322 130 44647	BC368

Top control panels [W]/[X]

Various

	4822 276 13396	Switch
	4822 265 10449	3P male h
	4822 212 10608	Top control panel FL6A [W]
	4822 212 10564	Top control panel FL6B [X]
1000	4822 212 11055	Front control panel FL6A-CL

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3630	4822 116 52269	3k3 5% 0.5W
3631	4822 116 52289	5k6 5% 0.5W
3632	4822 116 52257	22k 5% 0.5W
3634	4822 116 52175	100Ω 5% 0.5W

Front I/O panel [V]

Various

	4822 267 31014	1P male h
	4822 256 92101	Socket headph.+cinch+SV HS
	4822 265 41451	9P male v 1.25
	4822 265 31245	4P male v 2.5
1047	4822 212 10568	Front I/O panel FL6A/B [V]

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2800	4822 124 41596	22µF 20% 50V
2801	4822 124 41596	22µF 20% 50V
2804	4822 122 33805	330pF 10% 63V
2805	4822 122 33805	330pF 10% 63V
2810	4822 122 33342	33nF 10% 63V
2811	4822 124 41643	100µF 20% 16V
2813	4822 124 41576	2.2µF 20% 50V
2815	4822 126 13561	220nF 10% 16V
2816	4822 126 10002	100nF 20% 25V
2817	4822 124 41596	22µF 20% 50V
2832	4822 122 33177	10nF 20% 50V
2834	4822 122 33177	10nF 20% 50V

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3801	4822 116 52201	75Ω 5% 0,5W
3802	4822 116 52201	75Ω 5% 0,5W
3803	4822 050 11002	1k 1% 0,4W
3804	4822 050 11002	1k 1% 0,4W
3805	4822 116 52257	22k 5% 0,5W
3806	4822 116 52257	22k 5% 0,5W
3807	4822 116 52176	10Ω 5% 0,5W
3808	4822 051 20008	0Ω 5% 0,1W
3810	4822 051 20824	820k 5% 0,1W
3811	4822 051 20393	39k 5% 0,1W
3813	4822 117 11449	2k2 1% 0,1W
3814	4822 051 20392	3k9 5% 0,1W
3815	4822 051 10102	1k 2% 0,25W
3816	4822 051 10102	1k 2% 0,25W
3817	4822 051 20474	470k 5% 0,1W
3818	4822 050 11002	1k 1% 0,4W
3819	4822 116 83872	220Ω 5% 0,5W
3820	4822 116 52243	1k5 5% 0.5W
3830	4822 116 80173	10k 5% 0.5W
3842	4822 116 80173	10k 5% 0.5W
3999	4822 051 20101	100Ω 5% 0,1W

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6801	4822 130 81513	LLZ-C6V8
6802	4822 130 81513	LLZ-C6V8
6803	4822 130 82346	LLZ-C27
6804	4822 130 82346	LLZ-C27
6805	4822 130 82346	LLZ-C27
6806	4822 130 82346	LLZ-C27
6807	4822 130 81513	LLZ-C6V8
6808	4822 130 81513	LLZ-C6V8

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7811	5322 130 41983	BC858B
7812	5322 130 41983	BC858B
7815	5322 130 41982	BC848B
7816	5322 130 41983	BC858B

Mains switch panels [Y]

Various

	4822 466 11301	Protection plate for mains switch
	4822 256 91766	Led holder
▲	4822 265 30389	2P male h
▲	4822 276 12597	Mains switch
▲	4822 265 41462	7P male 1.25
	4822 265 10449	3P male
	4822 212 10687	Mains switch panel GR365/375M
1600	4822 130 91478	TFMK5360D

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2601	4822 124 11485	100µF 20% 16V
2604	4822 124 11486	220µF 20% 16V

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3522▲	4822 116 21217	VDR 1mA/423V 800V
3523	4822 053 21475	4M7 5% 0.5W
3600	4822 116 52175	100Ω 5% 0.5W
3601	4822 116 52175	100Ω 5% 0.5W
3602	4822 116 52213	180Ω 5% 0.5W
3604	4822 116 52175	100Ω 5% 0.5W
3605	4822 116 52175	100Ω 5% 0.5W
3611	4822 116 52175	100Ω 5% 0.5W
3613▲	4822 052 10109	10Ω 5% 0.33W

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6600	4822 130 34174	BZX79-C4V7
6601	4822 209 72895	TLUV5300

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7610	5322 130 44647	BC368

Front I/O panel [Z]

Various

	4822 267 31014	1P male h
	4822 256 92101	Socket headph.+cinch+SV HS
	4822 276 30422	Switch assy
	4822 265 10423	3P male
	4822 265 41451	9P male v 1.25
	4822 265 31245	4P male v 2.5
1047	4822 212 10686	Front control panel GR365/375M

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2800	4822 124 41596	22µF 20% 50V
2801	4822 124 41596	22µF 20% 50V
2804	4822 122 33805	330pF 10% 63V
2805	4822 122 33805	330pF 10% 63V
2810	4822 122 33342	33nF 10% 63V
2811	4822 124 41643	100µF 20% 16V
2813	4822 124 41576	2.2µF 20% 50V
2815	4822 126 13561	220nF 10% 16V
2816	4822 126 10002	100nF 20% 25V
2817	4822 124 41596	22µF 20% 50V
2832	4822 122 33177	10nF 20% 50V
2834	4822 122 33177	10nF 20% 50V

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3630	4822 116 52269	3k3 5% 0,5W
3631	4822 116 52289	5k6 5% 0,5W
3632	4822 116 52257	22k 5% 0.5W
3634	4822 116 52175	100Ω 5% 0,5W
3801	4822 116 52201	75Ω 5% 0.5W
3802	4822 116 52201	75Ω 5% 0.5W
3803	4822 050 11002	1k 1% 0.4W
3804	4822 050 11002	1k 1% 0,4W
3805	4822 116 52257	22k 5% 0,5W
3806	4822 116 52257	22k 5% 0,5W
3807	4822 116 52176	10Ω 5% 0.5W
3808	4822 051 20008	0Ω 5% 0,1W
3813	4822 117 11449	2k2 1% 0.1W
3814	4822 051 20392	3k9 5% 0,1W
3815	4822 051 10102	1k 2% 0,25W
3816	4822 051 10102	1k 2% 0,25W
3817	4822 051 20474	470k 5% 0,1W
3818	4822 051 10102	1k 2% 0,25W
3819	4822 116 83872	220Ω 5% 0.5W
3820	4822 116 52243	1k5 5% 0.5W
3810	4822 051 20824	820k 5% 0.1W
3811	4822 051 20393	39k 5% 0.1W
3830	4822 116 80173	10k 5% 0.5W
3842	4822 116 80173	10k 5% 0.5W

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6801	4822 130 81513	LLZ-C6V8
6802	4822 130 81513	LLZ-C6V8
6803	4822 130 82346	LLZ-C27
6804	4822 130 82346	LLZ-C27
6805	4822 130 82346	LLZ-C27
6806	4822 130 82346	LLZ-C27
6807	4822 130 81513	LLZ-C6V8
6808	4822 130 81513	LLZ-C6V8

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7811	5322 130 41983	BC858B
7812	5322 130 41983	BC858B
7815	5322 130 41982	BC848B
7816	5322 130 41983	BC858B

Audio amplifier panel [AA]

Various

	4822 265 31247	3P black 1.25
	4822 265 31251	5P grey 1.25
	4822 265 31248	3P grey 1.25
	4822 265 31246	6P male 2.5
	4822 267 31874	2P male 2.5
	4822 265 31245	4P male 2.5
	4822 492 62076	Spring for transistor
1001	4822 212 11273	Audio amplifier panel

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2700	4822 124 41579	10µF 20% 50V
2701	4822 122 32614	1,2nF 10% 50V
2702	4822 124 41579	10µF 20% 50V
2703	4822 122 32614	1.2nF 10% 50V
2704	4822 124 81082	3.3µF 20% 50V
2705	4822 122 32614	1,2nF 10% 50V
2707	4822 122 32614	1,2nF 10% 50V
2708	4822 126 13371	56nF 10% 50V
2712	4822 122 33893	18nF 10% 63V
2718	4822 126 10002	100nF 20% 25V
2719	4822 126 10002	100nF 20% 25V
2720	4822 121 51252	470nF 55 63V
2722	4822 126 13477	82nF 10% 25V
2724	4822 124 81269	120nF 10% 16V
2725	4822 126 13561	220nF 10% 16V
2728	5322 122 32654	22nF 10% 63V
2731	4822 126 13371	56nF 10% 50V
2733	4822 126 13371	56nF 10% 50V
2734	5322 122 31863	330pF 5% 50V
2735	5322 122 31863	330pF 5% 50V
2736	4822 126 10002	100nF 20% 25V
2737	4822 126 10002	100nF 20% 25V
2744	4822 126 13473	220nF 20% 50V
2745	4822 126 13473	220nF 20% 50V
2746	4822 126 13473	220nF 20% 50V
2747	4822 126 13473	220nF 20% 50V
2754	4822 126 13473	220nF 20% 50V
2755	4822 126 13473	220nF 20% 50V
2756	4822 126 13473	220nF 20% 50V
2757	4822 126 13473	220nF 20% 50V
2761	4822 124 41584	100µF 20% 10V
2762	4822 124 41579	10µF 20% 50V
2763	4822 124 41596	22µF 20% 50V
2764	4822 126 10002	100nF 20% 25V
2765	4822 126 10002	100nF 20% 25V
2766	4822 124 41334	470µF 20% 35V
2767	4822 124 41334	470µF 20% 35V
2768	4822 124 41579	10µF 20% 50V
2769	4822 124 41579	10µF 20% 50V
2774	4822 126 13473	220nF 20% 50V
2776	4822 126 13473	220nF 20% 50V
2784	4822 126 13473	220nF 20% 50V
2786	4822 126 13473	220nF 20% 50V
2787	4822 122 33177	10nF 20% 50V
2788	4822 124 40242	1µF 20% 63V

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3700	4822 051 20332	3k3 5% 0.1W
3701	4822 051 20822	8k2 5% 0.1W
3702	4822 116 52269	3k3 5% 0.5W
3703	4822 051 20822	8k2 5% 0.1W
3704	4822 051 20332	3k3 5% 0.1W
3705	4822 051 20822	8k2 5% 0.1W
3706	4822 051 20332	3k3 5% 0.1W
3707	4822 051 20822	8k2 5% 0.1W
3710	4822 051 20393	39k 5% 0.1W
3711	4822 051 20393	39k 5% 0.1W
3712	4822 051 20333	33k 5% 0.1W
3719	4822 051 20562	5k6 5% 0.1W
3720	4822 051 20223	22k 5% 0.1W
3721	4822 051 20153	15k 5% 0.1W
3722	4822 051 20182	1k8 5% 0.1W
3725	4822 051 20563	56k 5% 0.1W
3727	4822 116 83864	10k 5% 0.5W
3728	4822 117 10833	10k 1% 0.1W
3741	4822 051 20182	1k8 5% 0.1W
3742	4822 116 83961	6k8 5% 0.5W
3743	4822 116 52234	100k 5% 0.5W
3744	4822 051 20828	8Ω2 5% 0.1W
3745	4822 116 52234	100k 5% 0.5W
3746▲	4822 052 10828	8Ω2 5% 0.33W
3747	4822 051 20223	22k 5% 0.1W
3748	4822 051 20223	22k 5% 0.1W
3749	4822 116 83864	10k 5% 0.5W
3752	4822 051 20682	6k8 5% 0.1W
3753	4822 051 20104	100k 5% 0.1W
3754	4822 051 20828	8Ω2 5% 0.1W
3755	4822 051 20104	100k 5% 0.1W
3756▲	4822 052 10828	8Ω2 5% 0.1W
3760	4822 051 20473	47k 5% 0.1W
3761	4822 051 20473	47k 5% 0.1W
3762	4822 051 20471	470Ω 5% 0.1W
3763	4822 051 20104	100k 5% 0.1W
3764	4822 116 83883	470Ω 5% 0.5W
3765	4822 051 20104	100k 5% 0.1W
3766	4822 116 83872	220Ω 5% 0.5W
3767	4822 116 83872	220Ω 5% 0.5W
3768	4822 116 83872	220Ω 5% 0.5W
3769	4822 116 83872	220Ω 5% 0.5W
3771	4822 051 20472	4k7 5% 0.1W
3772	4822 051 20472	4k7 5% 0.1W
3775	4822 117 11503	220Ω 1% 0.1W
3776	4822 117 11503	220Ω 1% 0.1W
3799	4822 117 10833	10k 1% 0.1W
3999	4822 051 20101	100Ω 5% 0.1W
4xxx	4822 051 20008	0Ω 5% 0.1W

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6720	4822 130 30621	1N4148
6721	4822 130 30621	1N4148
6765	4822 130 34174	BZX79-B4V7
6768	4822 130 34278	BZX79-C6V8
6769	4822 130 34278	BZX79-C6V8

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7710	4822 209 30095	LM833D
7720	4822 209 30095	LM833D
7735	5322 209 14481	HEF4053BT
7740	4822 209 32641	TDA2616Q
7750	4822 209 32641	TDA2616Q
7760	5322 130 41982	BC848B
7761	5322 130 41982	BC848B
7762	5322 130 60508	BC857B
7767	5322 130 60508	BC857B

Audio supply panel [AB]

Various

	4822 265 31245	4P male 2.5
	4822 265 30389	2P male
	4822 265 31245	4P male 2.5
	4822 265 31246	6P male 2.5
	4822 492 62076	Spring for transistor
	4822 492 63524	Spring for transistor
	4822 256 92053	Fuse holder click
1002	4822 212 11274	Audio supply panel
1300▲	4822 070 32002	Fuse 2A

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2301	4822 124 11949	82µF 20% 400V
2302	4822 126 14109	150pF 5% 50V
2303	4822 121 41936	2.2µF 10% 100V
2304	5322 121 42386	100nF 5% 63V
2305	4822 121 10657	3.3nF 5% 2kV
2306	5322 121 42386	100nF 5% 63V
2307	4822 124 80367	1800µF 20% 35V
2308	4822 126 11141	2.2µF 10% 1kV
2309	4822 126 11141	2.2µF 10% 1kV
2310	4822 124 80367	1800µF 20% 35V
2311	4822 124 80366	15µF 20% 50V

2312	4822 121 51182	9.1nF 63V
2313	4822 126 11823	270pF 10% 500V
2314	4822 122 33302	1nF 5% 50V
2315	5322 121 42386	100nF 5% 63V
2316	4822 126 11141	2,2µF 10% 1kV
2317	4822 122 33293	100pF 5% 50V
2318	4822 122 33293	100pF 5% 50V
2319	4822 122 31177	470pF 10% 500V
2320	4822 122 31177	470pF 10% 500V
2321	4822 122 33302	1nF 5% 50V
2322	4822 124 40255	100µF 20% 63V
2325	4822 124 40255	100µF 20% 63V
2326	4822 124 40255	100µF 20% 63V

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3300	4822 117 12681	6Ω8 5% 5W
3301▲	4822 117 10118	1M 5% VR37
3302	4822 116 83883	470Ω 5% 0,5W
3303	4822 116 52175	100Ω 5% 0,5W
3304	4822 116 83864	10k 5% 0,5W
3305	4822 116 83872	220Ω 5% 0,5W
3306	4822 116 52179	12Ω 5% 0,5W
3307	4822 116 52297	68k 5% 0,5W
3308	4822 116 83882	39k 5% 0,5W
3309	4822 116 83961	6k8 5% 0,5W
3310	4822 116 52269	3k3 5% 0,5W
3311	4822 101 11187	1k 30% lin
3312	4822 116 52283	4k7 5% 0,5W
3313	4822 116 52283	4k7 5% 0,5W
3314	4822 116 52276	3k9 5% 0,5W
3315	4822 116 52244	15k 5% 0,5W
3316	4822 050 11002	1k 1% 0,4W
3317	4822 116 52191	33Ω 5% 0,5W
3318	4822 116 52175	100Ω 5% 0,5W
3319	4822 116 52249	1k8 5% 0,5W
3320	4822 116 52249	1k8 5% 0,5W
3321	4822 116 83884	47k 5% 0,5W
3322	4822 116 83961	6k8 5% 0,5W
3323	4822 116 83868	150Ω 5% 0,5W
3325	4822 116 83864	10k 5% 0,5W
3326	4822 116 83961	6k8 5% 0,5W
3327	4822 116 52179	12Ω 5% 0,5W
3329	4822 117 12682	150Ω 5% 5W
3331	4822 116 52175	100Ω 5% 0,5W
3332	4822 116 83882	39k 5% 0,5W
3333	4822 116 52249	1k8 5% 0,5W
3334	4822 116 52249	1k8 5% 0,5W
3335	4822 116 52249	1k8 5% 0,5W
3336	4822 116 83961	6k8 5% 0,5W
3337	4822 116 52195	47Ω 5% 0,5W
3338	4822 116 83961	6k8 5% 0,5W
3339	4822 116 83872	220Ω 5% 0,5W
3340	4822 116 83868	150Ω 5% 0,5W
3341	4822 116 52263	2k7 5% 0,5W
3342	4822 116 52231	820Ω 5% 0,5W
3343	4822 116 52195	47Ω 5% 0,5W
3344	4822 116 83882	39k 5% 0,5W
3345	4822 116 52206	120Ω 5% 0,5W
3346	4822 117 11744	0Ω22 5% 1W
3347	4822 116 52175	100Ω 5% 0,5W
3348	4822 116 83961	6k8 5% 0,5W
3349	4822 052 10108	1Ω 5% 0,33W
3398	4822 116 52206	120Ω 5% 0,5W

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5302	4822 157 70436	8,2µH 10%
5303	4822 157 60153	220µH 10%
5305	4822 146 10743	Transformer
5319	4822 152 20678	33µH 10%
5320	4822 152 20678	33µH 10%
5333	4822 157 71457	33µH 10%
5334	4822 152 20678	33µH 10%
5335	4822 157 71457	33µH 10%

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6301	4822 130 31933	1N5061
6302	4822 130 31933	1N5061
6303	4822 130 31933	1N5061
6304	4822 130 31933	1N5061
6305	4822 130 30621	1N4148
6307	4822 130 42488	BYD33D
6308	4822 130 30621	1N4148
6309	4822 130 30621	1N4148
6310	4822 130 80983	BYW29F-150
6311	4822 130 34167	BZX79-F6V2
6312	4822 130 80983	BYW29F-150
6313	4822 130 42488	BYD33D
6314	4822 130 30621	1N4148
6315	4822 130 30621	1N4148
6316	4822 130 30621	1N4148
6317	4822 130 30621	1N4148
6318	4822 130 30621	1N4148
6319	4822 130 30621	1N4148
6320	4822 130 41275	BY228/20
6321	4822 130 30862	BZX79-C9V1
6322	4822 130 30621	1N4148
6323	4822 130 30621	1N4148
6324	4822 130 31933	1N5061
6325	4822 130 31933	1N5061
6326	4822 130 30621	1N4148
6327	4822 130 30621	1N4148
6328	4822 130 34173	BZX79-C5V6
6329	4822 130 42488	BYD33D
6330	4822 130 30621	1N4148
6331	4822 130 34197	BZX79-C12
6332	4822 130 30621	1N4148
6333	4822 130 30621	1N4148
6334	4822 130 31983	BAT85
6335	4822 130 42488	BYD33D
6336	4822 130 31933	1N5061
6337	4822 130 42488	BYD33D

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7300	4822 130 40855	BC337
7301▲	4822 130 10834	CNY17
7302	4822 130 61265	BU508AF
7303	4822 130 44568	BC557B
7304	4822 130 44503	BC547C
7305	4822 130 40959	BC547B
7306	4822 130 40959	BC547B
7310	4822 130 42231	BC557C
7311	5322 130 44647	BC368
7312	4822 130 40959	BC547B
7314	5322 209 81148	MC78L12ACP
7315	4822 130 40855	BC337

FDS module [AC]

Various

E9F1	4822 210 20338	UV1216D-PH/HM
FL90	4822 242 10307	OFWG3956M
FL91	4822 242 81436	OFWK3953M
FL92	4822 242 70824	OFWM1956M
FL93	4822 242 81854	OFWG9353M
FL94	4822 242 82062	OFWL9454M
P9A1	4822 212 11188	FDS panel
X9K1	4822 242 81485	Crystal 3.579545MHz
X9K2	4822 242 81486	Crystal 4.433619MHz
X9T0	4822 242 73622	Crystal 5.5MHz 2 BPF
X9T1	4822 242 72187	Crystal 6.0MHz BPF
X9T2	4822 242 81665	Crystal 6.5MHz 3 BPF
X9T3	4822 242 10747	Crystal 4.5MHz BPF
X9T4	4822 242 71825	Filter TPS4.5MHz
X9T5	4822 242 10748	Filter TPS5.5MHz TRAP
X9T6	4822 242 81572	Filter TPS6.0MHz TRAP

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C9A1	4822 126 11687	0,1µF 20% 1608
C9A2	4822 126 11687	0,1µF 20% 1608
C9A3	4822 126 11687	0,1µF 20% 1608
C9A4	4822 126 11687	0,1µF 20% 1608
C9A5	4822 126 11687	0,1µF 20% 1608
C9A6	4822 126 11687	0,1µF 20% 1608
C9A7	4822 126 11687	0,1µF 20% 1608
C9A8	4822 126 11687	0,1µF 20% 1608
C9A9	4822 126 11687	0,1µF 20% 1608
C9B0	4822 126 11687	0,1µF 20% 1608
C9B1	4822 124 11074	SMD 10µF 20% 16V
C9B2	4822 126 11687	0,1µF 20% 1608
C9B3	4822 124 11074	SMD 10µF 20% 16V
C9B4	4822 124 11419	TT/1µF /16V 20%
C9B5	4822 124 11074	SMD 10µF 20% 16V
C9B6	4822 126 11687	0,1µF 20% 1608
C9B7	4822 124 11074	SMD 10µF 20% 16V
C9B8	4822 126 11687	0,1µF 20% 1608
C9B9	4822 126 11687	0,1µF 20% 1608
C9C0	4822 126 11687	0,1µF 20% 1608
C9C1	4822 126 11687	0,1µF 20% 1608
C9C2	4822 126 11687	0,1µF 20% 1608
C9C3	4822 126 11687	0,1µF 20% 1608
C9C4	4822 126 11687	0,1µF 20% 1608
C9C5	4822 126 11687	0,1µF 20% 1608
C9C6	4822 126 11687	0,1µF 20% 1608
C9C7	4822 126 11687	0,1µF 20% 1608
C9C8	4822 126 11687	0,1µF 20% 1608
C9C9	4822 124 11074	SMD 10µF 20% 16V
C9D0	4822 126 11687	0,1µF 20% 1608
C9D1	4822 126 11687	0,1µF 20% 1608
C9D2	4822 126 11687	0,1µF 20% 1608
C9D3	4822 126 11687	0,1µF 20% 1608
C9D4	4822 126 11687	0,1µF 20% 1608
C9D5	4822 126 11687	0,1µF 20% 1608
C9D6	4822 126 11687	0,1µF 20% 1608
C9D7	4822 124 11074	SMD 10µF 20% 16V
C9D8	4822 122 33777	47pF 5% CG 50V
C9D9	4822 122 33777	47pF 5% CG 50V
C9E0	4822 126 11687	0,1µF 20% 1608
C9E1	4822 126 11687	0,1µF 20% 1608
C9E2	4822 126 11687	0,1µF 20% 1608
C9E3	4822 126 11687	0,1µF 20% 1608
C9E4	4822 124 41842	SMD 47µF/16V 20%
C9E5	4822 122 33753	150pF 5% 1608
C9E6	4822 122 33753	150pF 5% 1608
C9E7	4822 126 13267	330pF (GR39)
C9E8	4822 126 13267	330pF (GR39)
C9E9	4822 122 33753	150pF 5% 1608
C9F0	4822 124 10772	SMD 100µF/16V 20%
C9F1	4822 124 41842	SMD 47µF/16V 20%
C9F2	4822 126 11687	0,1µF 20% 1608
C9F3	4822 126 11687	0,1µF 20% 1608
C9F4	4822 124 10772	SMD 100µF/16V 20%
C9F5	5322 126 11583	0,01µF 10% 1608
C9F6	5322 126 11583	0,01µF 10% 1608
C9F7	5322 126 11583	0,01µF 10% 1608
C9F9	5322 126 11583	0,01µF 10% 1608
C9G0	4822 126 11668	220pF
C9G1	4822 122 33785	68pF 5% 1608
C9G2	4822 126 11659	3pF 10% 1608
C9G3	5322 126 11583	0,01µF 10% 1608
C9G5	4822 126 11687	0,1µF 20% 1608
C9G6	5322 126 11583	0,01µF 10% 1608
C9G7	5322 126 11583	0,01µF 10% 1608
C9G8	5322 126 11583	0,01µF 10% 1608
C9G9	5322 126 11583	0,01µF 10% 1608
C9H0	4822 126 11687	0,1µF 20% 1608
C9H1	4822 126 11687	0,1µF 20% 1608
C9H2	4822 124 11419	TT/1µF /16V 20%
C9H3	4822 126 11688	0,047µF 20% 1608
C9H3	4822 126 11688	0,047µF 20% 1608
C9H4	4822 124 41842	SMD 47µF/16V 20%
C9H5	5322 126 11583	0,01µF 10% 1608
C9H6	4822 122 33782	56pF (GR39)
C9H8	4822 124 11419	TT/1µF /16V 20%
C9H9	4822 124 11419	TT/1µF /16V 20%
C9J0	4822 126 11687	0,1µF 20% 1608
C9J1	4822 126 11687	0,1µF 20% 1608
C9J2	4822 126 11687	0,1µF 20% 1608
C9J3	4822 126 11687	0,1µF 20% 1608
C9J4	4822 124 11419	TT/1µF /16V 20%
C9J5	4822 126 11687	0,1µF 20% 1608
C9J7	4822 126 11687	0,1µF 20% 1608
C9J8	4822 126 11687	0,1µF 20% 1608
C9J9	4822 126 11687	0,1µF 20% 1608
C9K0	4822 124 23127	TT/0,47µF/35V 20%
C9K1	4822 126 11566	2200pF 10% 1608
C9K2	4822 126 11687	0,1µF 20% 1608
C9K3	4822 126 11687	0,1µF 20% 1608
C9K4	4822 126 11687	0,1µF 20% 1608
C9K5	4822 126 11566	2200pF 10% 1608
C9K6	4822 126 11687	0,1µF 20% 1608
C9K7	4822 122 33757	18pF (GR39)
C9K8	4822 122 33752	15pF 5% CG 50V
C9K9	4822 126 11687	0,1µF 20% 1608
C9L0	4822 126 11687	0,1µF 20% 1608
C9L1	4822 124 41842	SMD 47µF/16V 20%
C9L2	4822 126 11687	0,1µF 20% 1608
C9L3	4822 126 11688	0,047µF 20% 1608
C9M1	4822 124 41842	SMD 47µF/16V 20%
C9M3	4822 126 11566	2200pF 10% 1608
C9M6	4822 126 14101	GRM39F224Z16 0,22µF
C9M7	4822 126 11687	0,1µF 20% 1608
C9M8	4822 122 33753	150pF 5% CG 50V
C9M9	4822 122 33753	150pF 5% CG 50V
C9N0	4822 124 41842	SMD 47µF/16V 20%
C9N1	4822 126 11687	0.1µF 20% 1608
C9N2	4822 126 11687	0.1µF 20% 1608
C9N3	4822 124 41842	SMD 47µF/16V 20%
C9P0	4822 126 11688	0,047µF 20% 1608
C9T0	4822 124 11074	SMD 10µF/16V 20%
C9T1	5322 126 11583	0,01µF 10% 1608
C9T2	5322 126 11583	0,01µF 10% 1608
C9T3	5322 126 11583	0,01µF 10% 1608
C9T4	5322 126 11583	0,01µF 10% 1608
C9T5	5322 126 11583	0,01µF 10% 1608
C9T6	4822 124 11419	TT/1µF /16V 20%
C9T7	4822 124 11419	TT/1µF /16V 20%
C9T8	4822 124 11419	TT/1µF /16V 20%
C9T9	4822 126 11687	0,1µF 20% 1608
C9Y0	4822 122 33753	150pF 5% 1608
C920	4822 126 11566	2200pF 10% 1608
C921	5322 126 11583	0,01µF 10% 1608
C922	4822 126 11566	2200pF 10% 1608
C923	5322 126 11583	0,01µF 10% 1608
C924	4822 126 11566	2200pF 10% 1608
C925	4822 126 11704	0,022µF
C926	4822 126 11685	4700pF 10% 50V

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R9A1	4822 117 11553	0Ω 5% 1/10W
R9A3	4822 051 30103	10k 5% 1/16W
R9A4	4822 051 30103	10k 5% 1/16W
R9A5	4822 051 30101	100Ω 5% 1/16W
R9A6	4822 051 30101	100Ω 5% 1/16W
R9A7	4822 051 30101	100Ω 5% 1/16W
R9A8	4822 051 30103	10k 5% 1/16W
R9A9	4822 051 30221	220Ω 5% 1/16W
R9B0	4822 051 30681	680Ω 5% 1/16W
R9B3	4822 051 30479	47Ω 5% 1/16W
R9B4	4822 051 30151	150Ω 5% 1/16W
R9B5	4822 051 30151	150Ω 5% 1/16W
R9B6	4822 051 30151	150Ω 5% 1/16W
R9B7	4822 117 11553	0Ω 5% 1/10W
R9C5	4822 051 30008	0Ω 5% 1/16W
R9C7	4822 051 30331	330Ω 5% 1/16W
R9C8	4822 051 30331	330Ω 5% 1/16W
R9C9	4822 051 30151	150Ω 5% 1/16W
R9D0	4822 051 30151	150Ω 5% 1/16W
R9D1	4822 051 30331	330Ω 5% 1/16W
R9D2	4822 051 30331	330Ω 5% 1/16W
R9D3	4822 051 30479	47Ω 5% 1/16W
R9D4	4822 051 30229	22Ω 5% 1/16W
R9D8	4822 051 30008	0Ω 5% 1/16W
R9D9	4822 051 30008	0Ω 5% 1/16W
R9F1	4822 051 30103	10k 5% 1/16W
R9F2	4822 051 30103	10k 5% 1/16W
R9F3	4822 051 30333	33k 5% 1/16W
R9F4	4822 051 30223	22k 5% 1/16W
R9F6	4822 051 30101	100Ω 5% 1/16W
R9F7	4822 051 30101	100Ω 5% 1/16W
R9F8	4822 051 30472	4k7 5% 1/16W
R9F9	4822 051 30472	4k7 5% 1/16W
R9G0	4822 051 30332	3k3 5% 1/16W
R9G1	4822 051 30472	4k7 5% 1/16W
R9G2	4822 051 30222	2k2 5% 1/16W
R9G3	4822 051 30332	3k3 5% 1/16W
R9G4	4822 051 30222	2k2 5% 1/16W
R9G5	4822 051 30479	47Ω 5% 1/16W
R9G6	4822 051 30332	3k3 5% 1/16W
R9G7	4822 051 30332	3k3 5% 1/16W
R9G8	4822 051 30103	10k 5% 1/16W
R9G9	4822 051 30103	10k 5% 1/16W
R9H0	4822 051 30332	3k3 5% 1/16W
R9H1	4822 051 30103	10k 5% 1/16W
R9H2	4822 051 30103	10k 5% 1/16W
R9H3	4822 051 30103	10k 5% 1/16W
R9H4	4822 051 30103	10k 5% 1/16W
R9H5	4822 101 11725	50k 25% 1/10W
R9H6	4822 051 30123	12k 5% 1/16W
R9H8	4822 051 30151	150Ω 5% 1/16W
R9H9	4822 051 30331	330Ω 5% 1/16W
R9J0	4822 051 30101	100Ω 5% 1/16W
R9J1	4822 051 30101	100Ω 5% 1/16W
R9J2	4822 051 30223	22k 5% 1/16W
R9J3	4822 051 30683	68k 5% 1/16W
R9J4	4822 051 30105	1M 5% 1/16W
R9J5	4822 051 30105	1M 5% 1/16W
R9J6	4822 051 30105	1M 5% 1/16W
R9J7	4822 051 30105	1M 5% 1/16W
R9K1	4822 051 30221	220Ω 5% 1/16W
R9K2	4822 051 30222	2k2 5% 1/16W
R9K4	4822 117 10154	10M 5% 1/16W
R9K5	4822 117 10154	10M 5% 1/16W
R9K6	4822 117 10154	10M 5% 1/16W
R9K8	4822 051 30103	10k 5% 1/16W
R9L2	4822 051 30102	1k 5% 1/16W
R9L3	4822 051 30222	2k2 5% 1/16W
R9L5	4822 051 30101	100Ω 5% 1/16W
R9L6	4822 051 30101	100Ω 5% 1/16W
R9L7	4822 051 30102	1k 5% 1/16W
R9L8	4822 051 30222	2k2 5% 1/16W
R9L9	4822 051 30102	1k 5% 1/16W
R9M1	4822 051 30008	0Ω 5% 1/16W
R9M3	4822 051 30471	470Ω 5% 1/16W
R9M4	4822 051 30152	1k5 5% 1/16W
R9M5	4822 051 30681	680Ω 5% 1/16W
R9M6	4822 051 30221	220Ω 5% 1/16W
R9M7	4822 051 30102	1k 5% 1/16W
R9M9	4822 051 30008	0Ω 5% 1/16W
R9N0	4822 111 20379	6.8Ω J 1/4W
R9N1	4822 116 60318	22Ω J 1/4W
R9N2	4822 051 30102	1k 5% 1/16W
R9N3	4822 051 30101	100Ω 5% 1/16W
R9N4	4822 051 30151	150Ω 5% 1/16W
R9N5	4822 051 30008	0Ω 5% 1/16W
R9N8	4822 051 30008	0Ω 5% 1/16W
R9N9	4822 051 30008	0Ω 5% 1/16W
R9T0	4822 051 30103	10k 5% 1/16W
R9T1	4822 051 30103	10k 5% 1/16W
R9T2	4822 051 30103	10k 5% 1/16W
R9T3	4822 051 30681	680Ω 5% 1/16W
R9T4	4822 051 30681	680Ω 5% 1/16W
R9T5	4822 051 30681	680Ω 5% 1/16W
R9T6	4822 051 30681	680Ω 5% 1/16W
R9T7	4822 051 30221	220Ω 5% 1/16W
R9T9	4822 051 30103	10k 5% 1/16W
R9V1	4822 051 30103	10k 5% 1/16W
R9V2	4822 051 30008	0Ω 5% 1/16W
R9V4	4822 051 30181	180Ω 5% 1/16W
R9V5	4822 051 30683	68k 5% 1/16W
R9V6	4822 051 30473	47k 5% 1/16W
R9V7	4822 051 30332	3k3 5% 1/16W
R9V8	4822 051 30222	2k2 5% 1/16W
R9V9	4822 051 30332	3k3 5% 1/16W
R9W0	4822 051 30332	3k3 5% 1/16W
R9W2	4822 051 30152	1k5 5% 1/16W
R9W3	4822 051 30102	1k 5% 1/16W
R9W4	4822 051 30332	3k3 5% 1/16W
R9W6	4822 051 30331	330Ω 5% 1/16W
R9W7	4822 051 30471	470Ω 5% 1/16W
R9W8	4822 051 30222	2k2 5% 1/16W
R9W9	4822 051 30102	1k 5% 1/16W
R9Z0	4822 051 30008	0Ω 5% 1/16W
R9Z1	4822 051 30008	0Ω 5% 1/16W
R9Z2	4822 051 30008	0Ω 5% 1/16W
R9Z3	4822 051 30474	470k 5% 1/16W
R9Z4	4822 051 30474	470k 5% 1/16W
R9Z5	4822 051 30103	10k 5% 1/16W
R9Z6	4822 051 30103	10k 5% 1/16W
R9Z7	4822 051 30103	10k 5% 1/16W
R9Z8	4822 051 30473	47k 5% 1/16W
R901	4822 051 30008	0Ω 5% 1/16W
R902	4822 051 30008	0Ω 5% 1/16W
R910	4822 051 30103	10k 5% 1/16W
R911	4822 051 30103	10k 5% 1/16W
R922	4822 051 30101	100Ω 5% 1/16W
R923	4822 051 30101	100Ω 5% 1/16W
R924	4822 051 30103	10k 5% 1/16W
R925	4822 051 30153	15k 5% 1/16W
R926	4822 051 30101	100Ω 5% 1/16W
R927	4822 051 30101	100Ω 5% 1/16W
R928	4822 051 30473	47k 5% 1/16W
R929	4822 051 30473	47k 5% 1/16W
R930	4822 051 30101	100Ω 5% 1/16W
R931	4822 051 30473	47k 5% 1/16W
R932	4822 051 30223	22k 5% 1/16W
R933	4822 051 30473	47k 5% 1/16W
R934	4822 051 30103	10k 5% 1/16W
R935	4822 051 30103	10k 5% 1/16W
R937	4822 051 30008	0Ω 5% 1/16W
R939	4822 051 30332	3k3k 5% 1/16W
R940	4822 051 30332	3k3k 5% 1/16W
R941	4822 051 30222	2k2k 5% 1/16W
R942	4822 051 30332	3k3k 5% 1/16W

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FL9A	4822 157 11157	BLM21A05PT
FL9B	4822 157 11157	BLM21A05PT
FL9C	4822 157 11157	BLM21A05PT
FL9D	4822 157 11157	BLM21A05PT
FL9E	4822 157 11157	BLM21A05PT
FL9F	4822 157 11157	BLM21A05PT
FL9G	4822 157 11157	BLM21A05PT
FL9J	4822 157 11157	BLM21A05PT
FL9K	4822 157 11157	BLM21A05PT
FL9L	4822 157 11157	BLM21A05PT
FL9N	4822 157 11157	BLM21A05PT
FL9P	4822 157 11157	BLM21A05PT
FL9R	4822 157 11157	BLM21A05PT
FL9T	4822 157 11157	BLM21A05PT
FL9U	4822 157 71208	BL01RN1-A62B1
FL9V	4822 157 71208	BL01RN1-A62B1
FL9W	4822 157 71208	BL01RN1-A62B1
FL99	4822 157 11157	BLM21A05PT
L9A0	4822 157 11243	NL322522-4R7M
L9A1	4822 157 11243	NL322522-4R7M
L9F1	4822 157 11242	NL322522-R33M 0.33µH
L9F2	4822 157 11238	292GNS-A716EL()
L9F3	4822 157 11244	NL322522 8.2µH
L9F4	4822 157 11241	NL322522-100K 10µH
L9F5	4822 157 11241	NL322522-100K 10µH
L9F6	4822 157 11241	NL322522-100K 10µH
L9F7	4822 157 11239	292GEAS-A693GJ()
L9F8	4822 157 11237	600GNS-7230X(7KL)

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D9G0	4822 130 10873	1SS314 CHIP BAND SW
D9G1	4822 130 10873	1SS314 CHIP BAND SW
D9G2	4822 130 10873	1SS314 CHIP BAND SW
D9G3	4822 130 10873	1SS314 CHIP BAND SW
D9G4	4822 130 10873	1SS314 CHIP BAND SW
D9G5	4822 130 10873	1SS314 CHIP BAND SW
D9G6	4822 130 10873	1SS314 CHIP BAND SW
D9G7	4822 130 10873	1SS314 CHIP BAND SW
D9G8	4822 130 10873	1SS314 CHIP BAND SW
D9G9	4822 130 10873	1SS314 CHIP BAND SW
D9T0	4822 130 10873	1SS314 CHIP BAND SW
D9T1	4822 130 10873	1SS314 CHIP BAND SW
Z9F0	4822 130 10801	02CZ33
Z9M1	4822 130 83229	02CZ3.9X
Z9N0	4822 130 81169	02CZ5.6Y

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IC9A	4822 209 15276	SAB9077H
IC9E	4822 209 15275	UPD482234LE70
IC9J	4822 209 12942	TDA9143
IC9K	4822 209 13028	TDA4665T
IC9L	4822 209 62605	4053
IC9N	5322 209 33172	PCF8574AT
IC9P	4822 209 62605	4053
IC9R	4822 209 33707	TDA9815/V3
Q9A0	4822 130 61541	2SC4116 (TOSHIBA)
Q9F1	4822 130 61541	2SC4116 NPN
Q9F2	4822 130 61541	2SC4116 NPN
Q9F3	4822 130 61541	2SC4116 NPN
Q9F5	4822 130 63598	2SA1586 PNP
Q9F6	4822 130 61541	2SC4116 NPN
Q9F7	4822 130 63602	2SC4215 NPN H.FREQ.
Q9M1	4822 130 61541	2SC4116 NPN
Q9M2	4822 130 61541	2SC4116 NPN
Q9M3	4822 130 63598	2SA1586 PNP
Q9M4	4822 130 63598	2SA1586 PNP
Q9N0	4822 130 61425	2SC2873 (Y)
Q9N1	4822 130 10874	BUK482-60A
Q9N2	4822 130 61541	2SC4116 (TOSHIBA)
Q9N3	4822 130 61541	2SC4116 (TOSHIBA)
Q920	4822 130 63598	2SA1586 PNP
Q921	4822 130 61541	2SC4116 NPN
Q922	4822 130 61541	2SC4116 (TOSHIBA)

YUV interface [AD]

Various

1365	4822 212 11189	YUV interface

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C9Z0	4822 124 11074	10µF / 16V

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R9X0	4822 051 30221	220Ω 5% 1/16W
R9X1	4822 051 30222	2k2 5% 1/16W
R9X2	4822 051 30221	220Ω 5% 1/16W
R9X3	4822 051 30222	2k2 5% 1/16W
R9X4	4822 051 30221	220Ω 5% 1/16W
R9X5	4822 051 30222	2k2 5% 1/16W
R9Y0	4822 051 30008	0Ω 5% 1/16W
R9Y1	4822 051 30008	0Ω 5% 1/16W
R9Y2	4822 051 30008	0Ω 5% 1/16W
R9Y3	4822 051 30008	0Ω 5% 1/16W
R9Y4	4822 051 30008	0Ω 5% 1/16W
R9Y5	4822 051 30008	0Ω 5% 1/16W
R9Y6	4822 051 30008	0Ω 5% 1/16W
R9Y7	4822 051 30008	0Ω 5% 1/16W
R9Y8	4822 051 30008	0Ω 5% 1/16W
R9Y9	4822 051 30104	100k 5% 1/16W

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FL9X	4822 157 11157	BLM21A05PT

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IC9V	4822 209 62605	4053
Q9X0	4822 130 63598	2SA1586 (O.Y)
Q9X1	4822 130 63598	2SA1586 (O.Y)
Q9X2	4822 130 63598	2SA1586 (O.Y)

Surround sound transmitter [AE1]

Various

	4822 212 11199	433 MHz 1chan transmitter
1403	4822 218 11567	433 MHz modulator
1407	4822 265 31249	5P black 1,25
1409	4822 265 31248	3P grey 1,25

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2110	5322 122 31873	2,7pF 5% 100V
2119	5322 122 31946	27pF 5% 63V
2120	5322 122 31873	2,7pF 5% 100V
2121	5322 122 32448	10pF 5% 50V
2122	4822 122 33575	220pF 5% 50V
2123	5322 122 32287	4,7pF 5% 50V
2124	5322 122 32967	5,6pF 10% 63V
2125	4822 122 33898	8,2pF 5% 63V
2126	5322 122 31873	2,7pF 5% 100V
2127	4822 122 33575	220pF 5% 50V
2128	4822 122 33575	220pF 5% 50V
2129	4822 122 33575	220pF 5% 50V
2130	5322 122 32967	5,6pF 10% 63V
2132	5322 122 32287	4,7pF 5% 50V
2133	4822 122 33575	220pF 5% 50V
2135	5322 122 32269	6,8pF 5% 50V
2136	4822 122 33575	220pF 5% 50V
2137	4822 122 33336	8,2nF 10% 50V
2138	4822 123 14018	2,2µF 10% 10V
2139	4822 126 13689	18pF 1% 63V
2140	4822 122 33336	8,2nF 10% 50V
2141	5322 122 32448	10pF 5% 50V
2142	5322 122 32654	22nF 10% 63V
2143	4822 122 33575	220pF 5% 50V
2144	4822 122 33575	220pF 5% 50V
2145	4822 122 33575	220pF 5% 50V
2146	5322 122 32452	47pF 5% 63V
2147	4822 122 33336	8,2nF 10% 50V
2401	4822 124 41579	10µF 20% 50V
2402	4822 124 40242	1µF 20% 63V
2404	4822 124 40242	1µF 20% 63V
2406	5322 126 10223	4,7nF 10% 63V
2408	4822 124 41579	10µF 20% 50V
2410	4822 124 41578	2,2µF 20% 50V
2412	4822 121 51252	470nF 55 63V
2414	4822 124 41576	2,2µF 20% 50V
2416	4822 124 41576	2,2µF 20% 50V
2418	4822 124 41579	10µF 20% 50V
2420	4822 124 23624	47µF 20% 16V
2421	5322 122 32452	47pF 5% 63V
2423	5322 122 32452	47pF 5% 63V
2425	5322 122 32654	22nF 10% 63V
2429	5322 122 32452	47pF 5% 63V
2430	4822 124 40242	1µF 20% 63V
2432	5322 122 32452	47pF 5% 63V
2435	4822 126 10326	180pF 5% 63V
2436	4822 122 33325	470nF 16V
2437	5322 122 34123	1nF 10% 50V
2438	5322 122 34123	1nF 10% 50V
2439	5322 122 32531	100pF 5% 50V
2442	4822 124 23624	47µF 20% 16V
2443	4822 124 23624	47µF 20% 16V
2444	5322 122 32531	100pF 5% 50V
2445	5322 122 32452	47pF 5% 63V
2447	4822 124 41579	10µF 20% 50V
2448	4822 122 32646	5,6nF 10% 50V
2449	4822 124 23624	47µF 20% 16V
2460	5322 122 32452	47pF 5% 63V
2462	5322 122 32531	100pF 5% 50V

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3001▲	4822 052 10478	4,7Ω 5% 0,33W
3139	4822 051 20473	47k 5% 0,1W
3140	4822 051 20183	18k 5% 0,1W
3141	4822 051 20333	33k 5% 0,1W
3142	4822 051 20471	470Ω 5% 0,1W
3143	4822 051 20473	47k 5% 0,1W
3144	4822 051 20101	100Ω 5% 0,1W
3145	4822 051 20331	330Ω 5% 0,1W
3146	4822 051 20104	100k 5% 0,1W
3147	4822 051 20101	100Ω 5% 0,1W
3148	4822 051 20101	100Ω 5% 0,1W
3149	4822 051 20223	22k 5% 0,1W
3150	4822 051 20223	22k 5% 0,1W
3151	4822 051 20273	27k 5% 0,1W
3152	4822 117 10353	150Ω 1% 0,1W
3153	4822 117 11139	1k5 1% 0,1W
3154	4822 117 10833	10k 1% 0,1W
3155	4822 051 20223	22k 5% 0,1W
3402	4822 051 20223	22k 5% 0,1W
3403	4822 051 20223	22k 5% 0,1W
3404	4822 051 20183	18k 5% 0,1W
3406	4822 051 20183	18k 5% 0,1W
3407	4822 051 20183	18k 5% 0,1W
3408	4822 117 11449	2k2 1% 0,1W
3410	4822 051 20472	4k7 5% 0,1W
3412	4822 051 20473	47k 5% 0,1W
3414	4822 051 20153	15k 5% 0,1W
3416	4822 051 20332	3k3 5% 0,1W
3418	4822 051 10102	1k 5% 0,1W
3419	4822 051 10102	1k 5% 0,1W
3422	4822 051 20183	18k 5% 0,1W
3424	4822 051 20183	18k 5% 0,1W
3426	4822 051 10102	1k 5% 0,1W
3430	4822 051 20473	47k 5% 0,1W
3432	4822 051 20563	56k 5% 0,1W
3440	4822 117 10833	10k 1% 0,1W
3441	4822 051 20104	100k 5% 0,1W
3442	4822 100 11348	1k 30% lin
3443	4822 051 20105	1M 5% 0,1W
3444	4822 051 20105	1M 5% 0,1W
3445	4822 051 20472	4k7 5% 0,1W
3446	4822 117 10833	10k 1% 0,1W
3447	4822 117 10833	10k 1% 0,1w
3448	4822 051 20104	100k 5% 0,1W
3449	4822 117 10833	10k 1% 0,1W
3450	4822 051 20104	100k 5% 0,1W
3451	4822 051 20273	27k 5% 0,1W
3453	4822 051 20472	47k 5% 0,1W
3458	4822 117 11503	220Ω 1% 0,1W
3459	4822 117 11503	220Ω 1% 0,1W
3473	4822 051 20122	1k2 5% 0,1W
3474	4822 051 20391	390Ω 5% 0,1W
3477▲	4822 052 10478	4,7Ω 5% 0,33W
3481	4822 051 20008	0Ω 5% 0,1W
3482	4822 051 20333	33k 5% 0,1W
3484	4822 117 10833	10k 1% 0,1W
3486	4822 051 20471	470Ω 5% 0,1W
3490	4822 051 20472	4k7 5% 0,1W
3501	4822 051 20471	470Ω 5% 0,1W
3502	4822 051 20471	470Ω 5% 0,1W
3503	4822 051 20822	8k2 5% 0,1W
3504	4822 051 20472	4k7 5% 0,1W
3505	4822 051 20471	470Ω 5% 0,1W
3507	4822 117 11503	220Ω 1% 0,1W
4xxx	4822 051 10008	0Ω 5% 0,25W

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5104	4822 157 71206	Ferrite bead
5108	4822 157 71206	ferrite bead
5401	4822 157 11219	Multiplex filter coil
5403	4822 242 81014	Crystal 38KHZ

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6134	4822 130 83614	BB135
6135	5322 130 34337	BAV99
6401	5322 130 31928	BAS16

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7107	5322 130 60647	BFR92A
7401	4822 209 83357	NJM4560M
7402	4822 209 83357	NJM4560M
7403	5322 209 73938	NE572N
7404	5322 209 11517	PC74HCU04D
7405	5322 130 41982	BC848B
7406	5322 130 41982	BC848B
7410	5322 130 41982	BC848B
7411	4822 209 33083	L7808CV

Surround sound supply+amplifier [AE2]

Various

1001	4822 212 11201	Supply+amplifier panel
1250	4822 267 10565	4P male v 2 50
1251	4822 267 10566	1P cinch
1260	4822 267 10567	4P male h 2 50
1263	4822 267 10573	8P male h 2 50
1313	4822 267 10574	8P male v 2.50
1315▲	4822 276 13224	Mains switch
1316	4822 265 20723	2P male v 7.92
1317	4822 265 20723	2P male v 7.92
1318	4822 265 31015	Socket support AC
1320	4822 071 52502	Fuse 2.5A
1376	4822 265 10872	2P female h

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2260	4822 124 41579	10μF 20% 50V
2261	4822 124 41584	100μF 20% 10V
2262	4822 124 11909	470μF 20% 25V
2264	4822 122 33195	100p 10% 50V
2265	5322 121 42386	100nF 5% 63V
2266	5322 121 42386	100nF 5% 63V
2268	5322 121 42386	100nF 5% 63V
2269	4822 121 51252	470nF 5% 63V
2271	4822 122 33519	470pF 10% 50V
2272	4822 126 12882	100nF 20% 50V
2273	4822 126 12785	47nF 10% 50V
2274	4822 122 33519	470pF 10% 50V
2275	5322 121 42386	100nF 5% 63V
2276	5322 121 42386	100nF 5% 63V
2277	4822 121 41857	10nF 5% 250V
2278	4822 121 41857	10nF 5% 250V
2279	4822 121 41854	150nF 5% 63V
2280	4822 124 41584	100μF 20% 10V
2281	4822 124 41751	47μF 20% 50V
2282	4822 124 80857	470μF 20% 16V
2283	4822 124 41751	47μF 20% 50V
2284	4822 124 40242	1μF 20% 63V
2285	4822 124 40246	4.7μF 20% 63V
2286	4822 124 40255	100μF 20% 63V
2287	4822 122 33191	22pF 5% 50V
2288	4822 122 33191	22pF 5% 50V
2289	4822 121 41854	150nF 5% 63V
2290	4822 124 40242	1μF 20% 63V
2291	4822 121 51252	470nF 5% 63V
2292	4822 122 33195	100p 10% 50V
2293	4822 124 41596	22μF 20% 50V
2295	4822 121 51252	470nF 5% 63V
2296	4822 121 51387	10nF 20% 16V
2297	4822 122 33197	1nF 10% 50V
2298	4822 122 33197	1nF 10% 50V
2300	4822 121 51387	10nF 20% 16V
2301	4822 121 51387	10nF 20% 16V
2302	4822 126 12882	100nF 20% 50V
2310	4822 126 12785	47nF 10% 50V
2311	4822 126 12785	47nF 10% 50V
2312	4822 122 33195	100p 10% 50V
2313	4822 121 51387	10nF 20% 16V
2314	4822 124 80984	2200μF 20% 25V
2315	4822 124 40242	1μF 20% 63V

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3260	4822 116 52269	3k3 5% 0.5W
3261	4822 116 52269	3k3 5% 0.5W
3263▲	4822 052 10279	27Ω 5% 0.33W
3264	4822 116 52222	390Ω 5% 0.5W
3265	4822 116 52283	4k7 5% 0.5W
3269	4822 116 52269	3k3 5% 0.5W
3270	4822 116 83874	220k 5% 0.5W
3271	4822 116 52269	3k3 5% 0.5W
3272	4822 116 52272	330k 5% 0.5W
3273	4822 116 52269	3k3 5% 0.5W
3274	4822 116 52234	100k 5% 0.5W
3275	4822 116 52285	470k 5% 0.5W
3276	4822 116 52304	82k 5% 0.5W
3277	4822 116 52271	33k 5% 0.5W
3278	4822 116 52283	4k7 5% 0.5W
3279	4822 116 83864	10k 5% 0.5W
3280	4822 116 83874	220k 5% 0.5W
3281	4822 116 83884	47k 5% 0.5W
3282	4822 116 83884	47k 5% 0.5W
3283	4822 116 83884	47k 5% 0.5W
3284	4822 116 52283	4k7 5% 0.5W
3285	4822 116 83884	47k 5% 0.5W
3286	4822 050 11002	1k 1% 0.4W
3287	4822 050 11002	1k 1% 0.4W
3288	4822 116 83961	6k8 5% 0.5W
3289	4822 116 52272	330k 5% 0.5W
3290	4822 116 52234	100k 5% 0.5W
3291	4822 116 52269	3k3 5% 0.5W
3292	4822 116 83884	47k 5% 0.5W
3293▲	4822 052 10228	2Ω2 5% 0.33W
3294▲	4822 052 10228	2Ω2 5% 0.33W
3295	4822 116 52219	330Ω 5% 0.5W
3296	4822 116 52283	4k7 5% 0.5W
3297	4822 116 83864	10k 5% 0.5W
3298	4822 116 83961	6k8 5% 0.5W
3301	4822 116 83961	6k8 5% 0.5W
3303	4822 116 83884	47k 5% 0.5W
3304	4822 116 83884	47k 5% 0.5W
3305	4822 116 83864	10k 5% 0.5W
3306▲	4822 052 10109	10Ω 5% 0.33W
3307	4822 116 52257	22k 5% 0.5W
3308	4822 116 83864	10k 5% 0.5W
3311	4822 116 52269	3k3 5% 0.5W
3312	4822 116 83884	47k 5% 0.5W
3313	4822 116 83884	47k 5% 0.5W
3314	4822 116 83884	47k 5% 0.5W
3315	4822 116 83884	47k 5% 0.5W
3316	4822 116 83864	10k 5% 0.5W
3317	4822 116 52283	4k7 5% 0.5W
3318	4822 050 11002	1k 1% 0.4W
3319	4822 116 83883	470Ω 5% 0.5W
3320	4822 116 83864	10k 5% 0.5W
3321	4822 116 52263	2k7 5% 0.5W
3323▲	4822 052 10109	10Ω 5% 0.33W
3324▲	4822 052 10109	10Ω 5% 0.33W

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5310▲	4822 280 10299	Relay 1P 9V 15A
5311▲	4822 157 71285	400μH 30%
5312▲	4822 146 10744	Mains transf std-by
5313▲	4822 146 10745	Mains transformer

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6260	5322 130 30684	1N4002GP
6264▲	4822 130 82079	D3SBA20
6265	4822 130 30621	1N4148
6266	4822 130 30621	1N4148
6267	5322 130 30684	1N4002GP
6268	5322 130 30684	1N4002GP
6270	4822 130 30621	1N4148
6271	4822 130 30621	1N4148
6272	4822 130 30621	1N4148
6273	4822 130 30621	1N4148
6274	4822 130 30621	1N4148
6275	4822 130 30621	1N4148
6276	4822 130 30621	1N4148
6277	4822 130 30621	1N4148
6278	4822 130 30621	1N4148
6310	4822 130 30621	1N4148
6311	4822 130 30621	1N4148
6312	5322 130 30684	1N4002GP
6313	5322 130 30684	1N4002GP
6314	5322 130 30684	1N4002GP
6315	5322 130 30684	1N4002GP
6360	4822 130 10418	LTL-16KGE
6361	4822 130 82978	LTL-16KPE

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7260	4822 209 30941	NJM2068D
7262	4822 209 80797	LM393N
7265	4822 130 44197	BC558B
7266	4822 130 44197	BC558B
7267	4822 209 90411	AN7164
7268	4822 130 44503	BC547C
7269	4822 130 42231	BC557C
7270	4822 130 40937	BC548B
7271	4822 130 40937	BC548B
7272	4822 130 44503	BC547C
7273	4822 130 42231	BC557C
7274	4822 130 44503	BC547C
7275	4822 209 33083	L7808CV
7310	4822 130 44503	BC547C

Surround sound receiver [AE3]

Various

1710	4822 218 11568	433MHz receiver
1765	4822 277 11671	Switch 7 positions

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2706	5322 122 32654	22nF 10% 63V
2710	5322 122 32654	22nF 10% 63V
2712	5322 122 32654	22nF 10% 63V
2714	4822 124 41576	2,2μF 20% 50V
2715	4822 124 41576	2,2μF 20% 50V
2716	4822 124 40246	4,7μF 20% 63V
2718	5322 122 32654	22nF 10% 63V
2720	4822 121 42729	1.5nF 2% 250V
2731	4822 124 41576	2.2μF 20% 50V
2732	4822 122 33797	47nF 20% 50V
2750	4822 126 13061	220nF 20% 25V
2751	5322 122 32531	100pF 5% 50V
2752	4822 126 13061	220nF 20% 25V
2753	5322 122 32654	22nF 10% 63V
2754	4822 124 40246	4.7μF 20% 63V
2755	5322 122 32654	22nF 10% 63V
2770	4822 124 40433	47μF 20% 25V
2771	5322 122 32654	22nF 10% 63V
2772	4822 124 41576	2,2μF 20% 50V
2773	4822 124 41576	2.2μF 20% 50V
2774	4822 121 51252	470nF 5% 63V
2779	5322 122 32654	22nF 10% 63V
2780	4822 124 41579	10μF 20% 50V
2781	4822 124 40246	4,7μF 20% 63V
2782	5322 126 10223	4,7nF 10% 63V
2783	4822 124 41576	2,2μF 20% 50V
2790	4822 124 40246	4,7μF 20% 63V
2791	4822 126 13061	220nF 20% 25V
2792	4822 122 33575	220pF 5% 50V
2794	4822 122 33575	220pF 5% 50V

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3701	4822 051 20471	470Ω 5% 0,1W
3702	4822 051 20471	470Ω 5% 0,1W
3703	4822 117 11449	2k2 1% 0,1W
3704	4822 051 20471	470Ω 5% 0,1W
3705	4822 051 20101	100Ω 5% 0,1W
3706	4822 051 20272	2k7 5% 0,1W
3707	4822 051 20331	330Ω 5% 0,1W
3708	4822 051 20478	4Ω7 5% 0,1W
3709	4822 117 11448	180Ω 1% 0,1W
3710	4822 051 20471	470Ω 5% 0,1W
3711	4822 051 10008	0Ω 5% 0,25W
3712	4822 051 20392	3k9 5% 0,1W
3716	4822 051 20332	3k3 5% 0,1W
3717	4822 117 11449	2k2 1% 0,1W
3719	4822 051 20332	3k3 5% 0,1W
3720	4822 051 20153	15k 5% 0,1W
3721	4822 100 20168	10k 30% lin
3730	4822 051 20101	100Ω 5% 0,1W
3731	4822 117 11383	12k 1% 0,1W
3732	4822 051 20153	15k 5% 0,1W
3733	4822 051 20332	3k3 5% 0,1W
3734	4822 051 20561	560Ω 5% 0,1W
3735	4822 051 20121	120Ω 5% 0,1W
3736	4822 051 20008	0Ω 5% 0,1W
3750	4822 117 11448	180Ω 1% 0,1W
3753	4822 117 10833	10k 1% 0,1W
3754	4822 051 20104	100k 5% 0,1W
3755	4822 117 10833	10k 1% 0,1W
3756	4822 117 10833	10k 1% 0,1W
3765	4822 051 10008	0Ω 5% 0,25W
3767	4822 051 10008	0Ω 5% 0,25W
3770	4822 116 83872	220Ω 5% 0,5W
3771	4822 117 10833	10k 1% 0,1W
3772	4822 051 20332	3k3 5% 0,1W
3779	4822 051 10102	1k 2% 0,25W
3780	4822 051 20104	100k 5% 0,1W
3781	4822 051 20183	18k 5% 0,1W
3782	4822 051 20473	47k 5% 0,1W
3783	4822 117 11449	2k2 1% 0,1W
3784	4822 117 11449	2k2 1% 0,1W
3785	4822 117 11449	2k2 1% 0,1W
3790	4822 117 11449	2k2 1% 0,1W
3791	4822 051 10008	0Ω 5% 0,25W
3793	4822 051 20104	100k 5% 0,1W
3794	4822 051 10008	0Ω 5% 0.25W

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5705	4822 157 71206	Coil
5706	4822 242 70665	Filter 10,7MHz
5707	4822 242 70665	Filter 10,7MHz
5710	4822 157 63904	Q detection coil
5730	4822 157 11219	Multiplex filter coil
5750	4822 242 72527	Crystal 4MHz

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6710	5322 130 34331	BAV70
6751	4822 130 30621	1N4148
6752	5322 130 31928	BAS16
6770	4822 130 34382	BZX79-C8V2

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7707	4822 130 42353	BFS19
7710	4822 209 60658	LA1805
7735	5322 130 41982	BC848B
7750	4822 209 15264	Microcontroller
7755	5322 130 41982	BC848B
7770	5322 209 73938	NE572N
7780	4822 209 83274	NJM4560D
7784	5322 130 41982	BC848B
7789	5322 130 41982	BC848B
7790	4822 209 15263	L78L06ACZ

VGA interface [AF]

Various

	4822 265 31242	2P ed 2,5
	4822 265 10787	11P ed 1,25 grey
	4822 265 10788	11P ed 1,25 black
	4822 265 31248	3P ed 1,25 grey
	4822 267 51477	15P female h
1061	4822 212 11272	VGA interface 24"
1061	4822 212 11269	VGA interface 28"

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2110	4822 126 13869	470nF 20% 16V
2114	4822 124 40433	47μF 20% 25V
2120	4822 126 13869	470nF 20% 16V
2130	4822 126 13869	470nF 20% 16V
2140	4822 124 41584	100μF 20% 10V
2141	4822 122 33797	47nF 20% 50V
2142	4822 124 40242	1μF 20% 63V
2144	4822 122 33216	270pF 5% 50V
2145	4822 122 32646	5,6nF 10% 50V
2147	5322 122 32531	100pF 55 50V
2150	4822 126 10002	100nF 20% 25V
2160	4822 126 10002	100nF 20% 25V
2163	5322 122 34123	1nF 10% 50V
2164	4822 122 33797	47nF 20% 50V
2165	4822 126 10002	100nF 20% 25V
2166	4822 126 10002	100nF 20% 25V
2170	4822 126 13869	470nF 20% 16V
2175	4822 126 10002	100nF 20% 25V
2176	4822 126 10002	100nF 20% 25V
2180	4822 126 10002	100nF 20% 25V
2211	4822 126 10002	100nF 20% 25V

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3101	4822 051 20101	100Ω 5% 0,1W
3102	4822 116 52201	75Ω % 0,5W
3103	4822 051 20101	100Ω 5% 0,1W
3104	4822 116 52201	75Ω % 0,5W
3106	4822 116 52201	75Ω % 0,5W
3107	4822 051 20101	100Ω 5% 0,1W
3109	4822 052 10398	3Ω9 5% 0,33W
3110	4822 051 20101	100Ω 5% 0,1W
3111	4822 051 20473	47k 5% 0,1W
3112	4822 051 20473	47k 5% 0,1W
3114	4822 117 11503	220Ω 1% 0,1W
3120	4822 051 20101	100Ω 5% 0,1W
3121	4822 051 20473	47k 5% 0,1W
3122	4822 051 20473	47k 5% 0,1W
3124	4822 117 11503	220Ω 1% 0,1W
3130	4822 051 20101	100Ω 5% 0,1W
3131	4822 051 20473	47k 5% 0,1W
3132	4822 051 20473	47k 5% 0,1W
3134	4822 117 11503	220Ω 1% 0,1W
3140	4822 116 52175	100Ω 5% 0,5W
3141	4822 051 20224	220k 5% 0,1W
3142	4822 051 20273	27k 5% 0,1W
3143	4822 051 20474	470k 5% 0,1W
3144	4822 051 10102	1k 25 0,25W
3145	4822 117 10833	10k 1% 0.1W
3146	4822 117 10833	10k 1% 0,1W
3147	4822 051 10102	1k 25 0,25W
3150	4822 052 10398	3Ω9 5% 0,33W
3151	4822 116 52175	100Ω 5% 0,5W
3152	4822 116 52175	100Ω 5% 0,5W

3155	4822 051 20101	100Ω 5% 0,1W
3156	4822 051 10102	1k 2% 0.25W
3157	4822 051 20101	100Ω 5% 0,1W
3158	4822 051 10102	1k 2% 0.25W
3160	4822 051 20101	100Ω 5% 0,1W
3161	4822 117 11383	12k 1% 0,1W
3162	4822 101 11191	10k 30% lin
3163	4822 051 20223	22k 5% 0,1W
3164	4822 051 20154	150k 5% 0,1W
3165	4822 051 20104	100k 5% 0,1W
3166	4822 051 20564	560k 5% 0,1W
3167	4822 051 20472	4k7 5% 0,1W
3168	4822 116 52175	100Ω 5% 0.5W
3170	4822 051 20224	220k 5% 0,1W
3171	4822 051 20564	560k 5% 0,1W
3172	4822 051 20472	4k7 5% 0,1W
3175	4822 051 20471	470Ω 5% 0,1W
3176	4822 051 20471	470Ω 5% 0,1W
3177	4822 051 20474	470k 5% 0,1W
3178	4822 051 20474	470k 5% 0,1W
3180	4822 052 10398	3Ω9 5% 0,33W
3181	4822 051 20471	470Ω 5% 0,1W
3182	4822 051 20471	470Ω 5% 0,1W
3189	4822 117 11449	2k2 1% 0,1W

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5100	4822 157 50964	100μH 10%

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6100	4822 130 81513	LLZ-C6V8
6101	4822 130 81513	LLZ-C6V8
6102	4822 130 81513	LLZ-C6V8
6103	4822 130 81513	LLZ-C6V8
6106	4822 130 81513	LLZ-C6V8
6107	4822 130 81513	LLZ-C6V8
6110	4822 130 81513	LLZ-C6V8
6120	4822 130 81513	LLZ-C6V8
6130	4822 130 81513	LLZ-C6V8
6140	4822 130 80446	LL4148
6151	4822 130 81513	LLZ-C6V8
6152	4822 130 81513	LLZ-C6V8
6155	4822 130 81513	LLZ-C6V8
6156	4822 130 81513	LLZ-C6V8
6157	4822 130 81513	LLZ-C6V8
6158	4822 130 81513	LLZ-C6V8
6175	4822 130 80446	LL4148
6176	4822 130 80446	LL4148
6181	4822 130 81513	LLZ-C6V8
6182	4822 130 81513	LLZ-C6V8

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7111	5322 130 42136	BC848C
7121	5322 130 42136	BC848C
7131	5322 130 42136	BC848C
7140	5322 209 73332	74HCT4096AN
7150	5322 209 12616	74HCT126N
7160	4822 209 71585	74HCT4538N
7165	5322 130 42136	BC848C
7170	5322 209 11473	74HCT86N
7171	5322 130 42136	BC848C
7180	4822 209 63896	PCF8574AP

VGA input panel [AF]

Various

	4822 267 31941	Socket 2xcinch
	4822 265 41451	9P male v bl

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2220	4822 124 41579	10μF 20% 50V
2222	4822 124 41584	100μF 20% 10V
2226	4822 122 33805	33pF 10% 63V
2227	4822 124 41579	10μF 20% 50V
2231	4822 122 33805	33pF 10% 63V
2232	4822 124 41579	10μF 20% 50V

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3220	4822 116 83872	220Ω 5% 0.5W
3221	4822 051 20223	22k 5% 0.1W
3222	4822 051 20223	22k 5% 0,1W
3225	4822 051 20223	22k 5% 0,1W
3226	4822 051 10102	1k 2% 0,25W
3227	4822 051 20224	220k 5% 0,1W
3230	4822 051 20223	22k 5% 0,1W
3231	4822 051 10102	1k 2% 0.25W
3232	4822 051 20224	220k 5% 0,1W
3235	4822 051 20224	220k 5% 0,1W
3238	4822 051 20224	220k 5% 0,1W
3242	4822 051 20472	4k7 5% 0,1W
3244	4822 117 10833	10k 1% 0,1W
3245	4822 117 10833	10k 1% 0,1W
3999	4822 051 20101	100Ω 5% 0,1W
3999	4822 117 11503	220Ω 1% 0,1W

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6225	4822 130 81513	LLZ-C6V8
6226	4822 130 81513	LLZ-C6V8
6230	4822 130 81513	LLZ-C6V8
6231	4822 130 81513	LLZ-C6V8
6250	4822 130 81513	LLZ-C6V8
6252	4822 130 81513	LLZ-C6V8
6254	4822 130 81513	LLZ-C6V8
6255	4822 130 81513	LLZ-C6V8
6257	4822 130 81513	LLZ-C6V8

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7230	5322 209 10576	4053B
7242	5322 130 42136	BC848C

Mains switch panel FL5+ [AH]

Various

	4822 256 92284	Ledholder
	4822 265 30389	2P vert.
▲	4822 276 13592	Main switch
	4822 265 41462	7P ed 1,25 white
1001	4822 212 11248	Mains switch panel FL5+
1600	4822 212 30842	IR receiver TFMS536

⊣⊢

2601	4822 124 41643	100uF 20% 16V
2604	4822 124 40196	220uF 20% 16V

▭

3522▲	4822 116 21217	VDR DC 1mA/423V
3523	4822 053 21475	4M7 5% 0,5W
3600	4822 116 52175	100Ω 5% 0.5W
3601	4822 116 52175	100Ω 5% 0,5W
3602	4822 116 52213	180Ω 5% 0,5W
3604	4822 116 52175	100Ω 5% 0,5W
3605	4822 116 52175	100Ω 5% 0,5W
3611	4822 116 52175	100Ω 5% 0,5W
3613▲	4822 052 10109	10Ω 5% 0,33W

→|

6600	4822 130 34174	BZX79-C4V7
6610	4822 130 83414	TLHR4405
6611	4822 130 80313	TLHG4400
6612	4822 130 81642	TSIP5201

⊗▭

7610	5322 130 44647	BC368

AV-in/out + control panel FL5+ [AG]

Various

	4822 276 13591	Switch
	4822 256 10342	Switch holder
	4822 265 41463	Socket headph.+cinch+SV HS
	4822 265 41451	9P ed 1,25 bl
	4822 265 31245	4P ed 2.5
	4822 265 10423	3P male v
1001	4822 212 11249	Control panel FL5+

⊣⊢

2800	4822 124 41596	22μF 20% 50V
2801	4822 124 41596	22μF 20% 50V
2804	5322 122 31863	330pF 5% 50V
2805	5322 122 31863	330pF 5% 50V
2810	4822 122 33342	33nF 10% 63V
2811	4822 124 41643	100μF 20% 16V
2813	4822 124 41576	2.2μF 20% 50V
2815	4822 126 13561	220nF 10% 16V
2816	4822 126 10002	100nF 20% 25V
2817	4822 124 41596	22μF 20% 50V
2832	4822 122 33177	10nF 20% 50V
2834	4822 122 33177	10nF 20% 50V

▭

3630	4822 116 52257	22k 5% 0,5W
3631	4822 116 52269	3k3 5% 0,5W
3632	4822 116 52289	5k6 5% 0,5W
3634	4822 116 52175	100Ω 5% 0,5W
3801	4822 116 52201	75Ω 5% 0,5W
3802	4822 116 52201	75Ω 5% 0,5W
3803	4822 050 11002	1k 1% 0,4W
3804	4822 050 11002	1k 1% 0,4W
3805	4822 116 52257	22k 5% 0,5W
3806	4822 116 52257	22k 5% 0,5W
3807	4822 116 52176	10Ω 5% 0,5W
3808	4822 051 20008	0Ω 5% 0.1W
3810	4822 051 20824	820k 5% 0,1W
3811	4822 051 20393	39k 5% 0.1W
3813	4822 117 11449	2k2 1% 0,1W
3814	4822 051 20392	3k9 5% 0,1W
3815	4822 051 10102	1k 5% 0,1W
3816	4822 051 10102	1k 5% 0,1W
3817	4822 051 20474	470k 5% 0,1W
3818	4822 051 10102	1k 5% 0.1W
3819	4822 116 83872	220Ω 5% 0.5W
3820	4822 116 52243	1k5 5% 0,5W
3830	4822 116 80173	10k 5% 0,5W
3842	4822 116 80173	10k 5% 0,5W
3998	4822 116 52175	100Ω 5% 0,5W
3999	4822 051 20101	100Ω 5% 0,1W

→|

6801	4822 130 81513	LLZ-C6V8
6802	4822 130 81513	LLZ-C6V8
6803	4822 130 82346	LLZ-C27
6804	4822 130 82346	LLZ-C27
6805	4822 130 82346	LLZ-C27
6806	4822 130 82346	LLZ-C27
6807	4822 130 81513	LLZ-C6V8
6808	4822 130 81513	LLZ-C6V8

⊗▭

7811	5322 130 60508	BC857B
7812	5322 130 60508	BC857B
7815	5322 130 41982	BC848B
7816	5322 130 60508	BC857B

AV-in/out + control + VGA panel FL5+ [AG2]

Various

	4822 276 13591	Switch
	4822 256 10342	Switch holder
	4822 265 41463	Socket headph.+cinch+SV HS
	4822 265 41451	9P ed 1.25 bl
	4822 265 31245	4P ed 2.5
	4822 265 10423	3P male v
	4822 265 10787	11P ed 1.25 gy
	4822 267 51477	15P female h
1049	4822 212 11271	VGA input panel

⊣⊢

2800	4822 124 41596	22uF 20% 50V
2801	4822 124 41596	22uF 20% 50V
2804	4822 122 33805	330pF 10% 63V
2805	4822 122 33805	330pF 10% 63V
2810	4822 122 33342	33nF10% 63V
2811	4822 124 41643	100μF 20% 16V
2813	4822 124 41576	2.2μF 205 50V
2815	4822 126 13561	220nF 10% 16V
2816	4822 126 10002	100nF 20% 25v
2817	4822 124 41596	22μF 20% 50V
2832	4822 122 33177	10nF 20% 50V
2834	4822 122 33177	10nF 20% 50V
2837	5322 122 32452	47pF 5% 63V
2838	5322 122 32452	47pF 5% 63V

▭

3801	4822 116 52201	75Ω 5% 0.5W
3802	4822 116 52201	75Ω 5% 0.5W
3803	4822 050 11002	1k 1% 0,1W
3804	4822 050 11002	1k 1% 0,1W
3805	4822 116 52257	22k 5% 0.5W
3806	4822 116 52257	22k 5% 0.5W
3807	4822 116 52176	10Ω 5% 0.5W
3808	4822 051 20008	0Ω 5% 0.1W
3810	4822 051 20824	820k 5% 0.1W
3811	4822 051 20393	39k 5% 0.1W
3813	4822 117 11449	2k2 1% 0.1W
3814	4822 051 20392	3k9 5% 0.1W
3815	4822 051 10102	1k 2% 0.25W
3816	4822 051 10102	1k 2% 0.25W
3817	4822 051 20474	470k 5% 0.1W
3818	4822 051 10102	1k 2% 0.25W
3819	4822 116 83872	220Ω 5% 0.5W
3820	4822 116 52243	1k5 5% 0.5W
3821	4822 116 52201	75Ω 5% 0.5W
3822	4822 116 52201	75Ω 5% 0 5W
3823	4822 116 52201	75Ω 5% 0.5W
3824	4822 050 11002	1k 1% 0,1W
3825	4822 050 11002	1k 1% 0,1W
3830	4822 116 80173	10k 5% 0.5W
3832	4822 116 52257	22k 5% 0.5W
3833	4822 116 52269	3k3 5% 0.5W
3834	4822 116 52289	5k6 5% 0.5W
3836	4822 116 52175	100Ω 5% 0.5W
3837	4822 051 20101	100Ω 5% 0.1W
3838	4822 051 20101	100Ω 5% 0.1W
3842	4822 116 80173	10k 5 0.5W
3999	4822 051 20101	100Ω 5% 0.1W

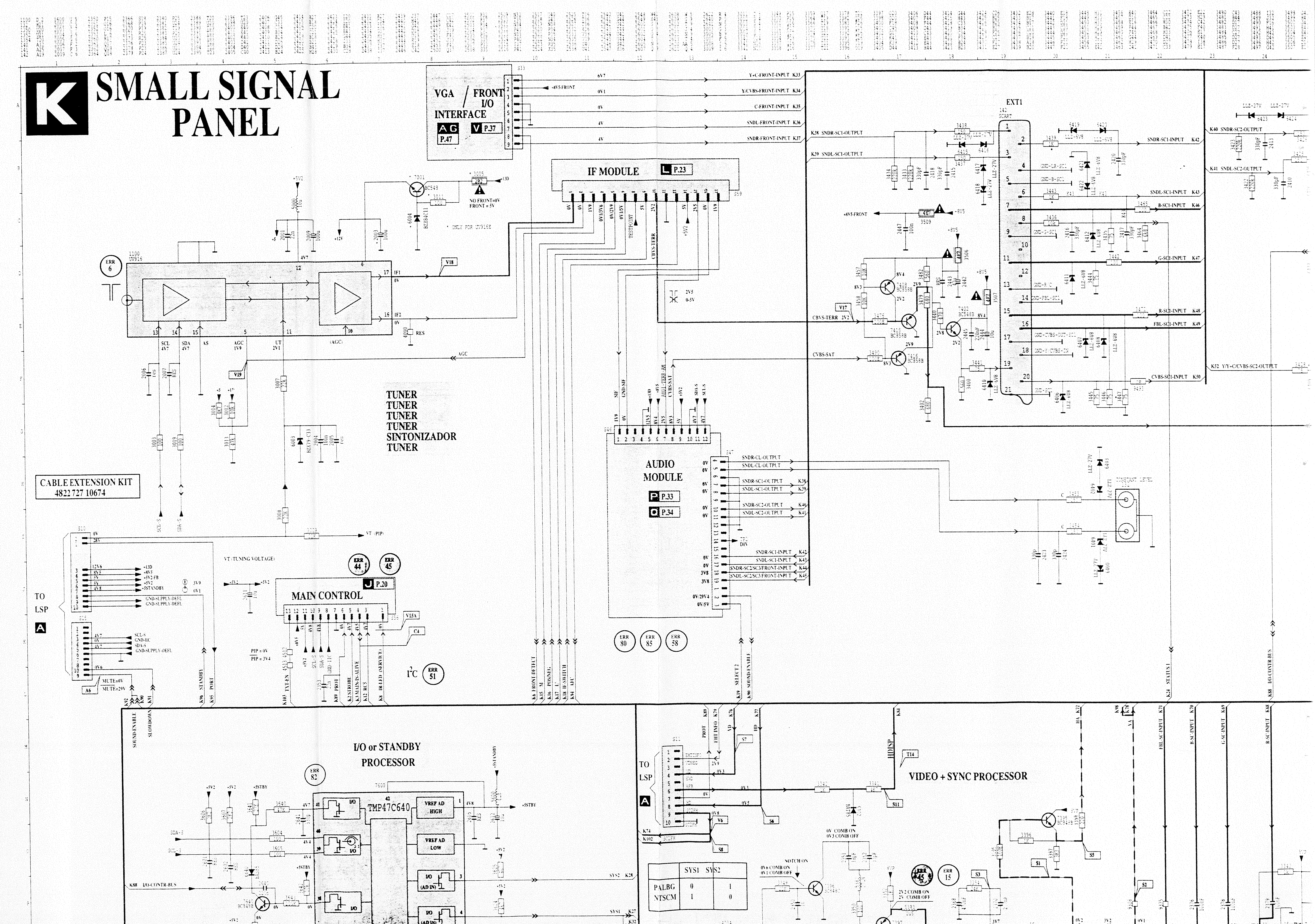
→|

6801	4822 130 81513	LLZ-C6V8
6802	4822 130 81513	LLZ-C6V8
6803	4822 130 82346	LLZ-C27
6804	4822 130 82346	LLZ C27
6805	4822 130 82346	LLZ-C27
6806	4822 130 82346	LLZ-C27
6807	4822 130 81513	LLZ-C6V8
6808	4822 130 81513	LLZ-C6V8
6810	4822 130 81513	LLZ-C6V8
6811	4822 130 81513	LLZ-C6V8
6812	4822 130 81513	LLZ-C6V8
6813	4822 130 81513	LLZ-C6V8
6814	4822 130 81513	LLZ-C6V8
6815	4822 130 81513	LLZ-C6V8
6816	4822 130 81513	LLZ-C6V8
6817	4822 130 81513	LLZ-C6V8
6818	4822 130 81513	LLZ-C6V8
6819	4822 130 81513	LLZ-C6V8

⊗▭

7811	5322 130 60508	BC857B
7812	5322 130 60508	BC857B
7815	5322 130 41982	BC848B
7816	5322 130 60508	BC857B

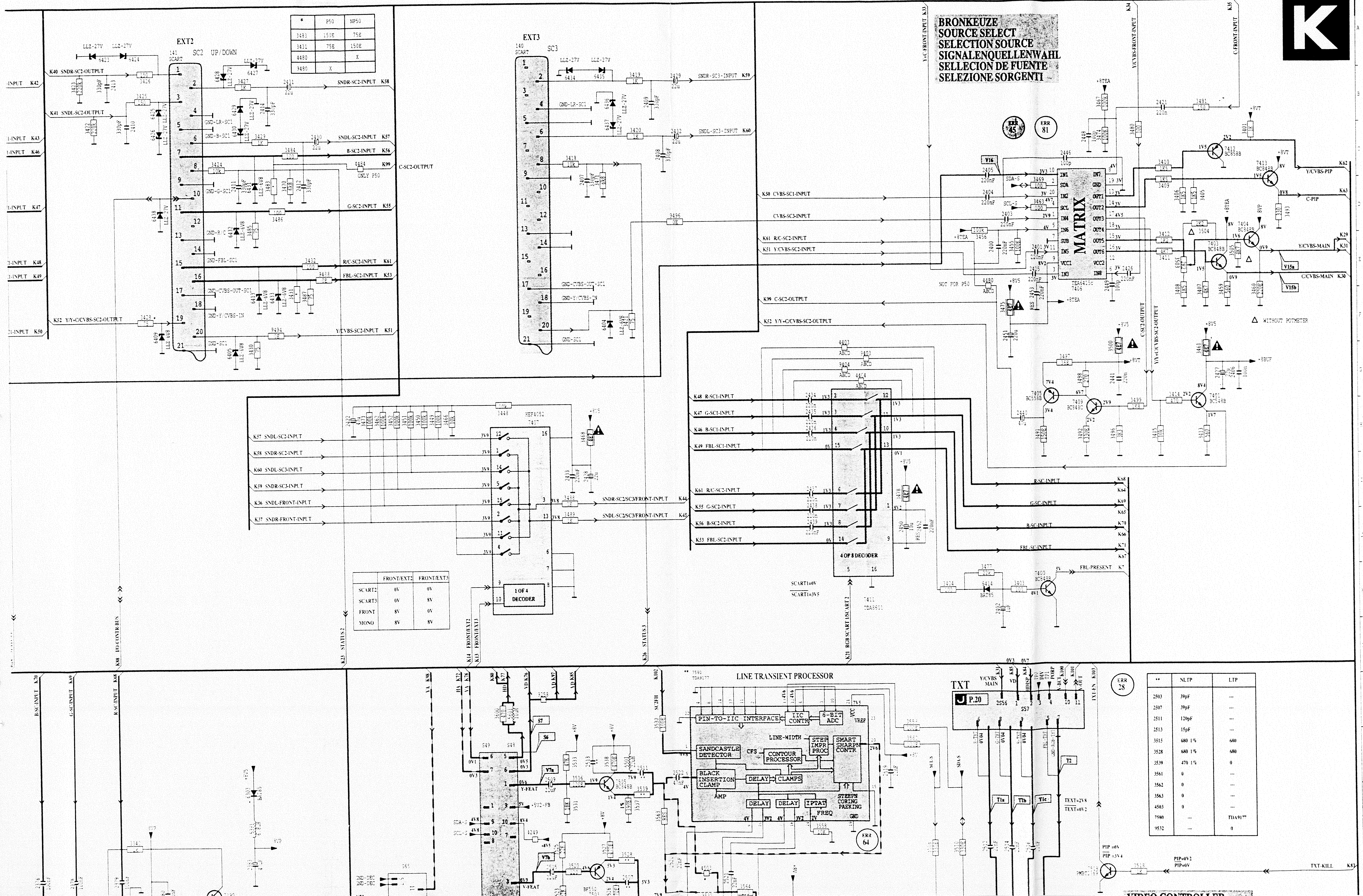
K SMALL SIGNAL PANEL



VGA / FRONT I/O INTERFACE
AG P.47
V P.37
IF MODULE
L P.23
1100 UV916
IF1
IF2
SCL 4V7
SDA 4V7
AS
AGC 1V9
UT 2V1
TUNER
TUNER
TUNER
TUNER
SINTONIZADOR
TUNER
ERR 6
7001 BC548
NO FRONT=0V
FRONT = 5V
ONLY FOR UV916E
AUDIO MODULE
P P.33
Q P.34
EXT1
SCART
MAIN CONTROL
J P.20
ERR 44
ERR 45
ERR 51
I^2C
ERR 80
ERR 85
ERR 58
CABLE EXTENSION KIT
4822 727 10674
TO LSP
A
VT (TUNING VOLTAGE)
VT (PIP)
MUTE=0V
MUTE=29V
I/O or STANDBY PROCESSOR
ERR 82
TMP47C640
VREF AD HIGH
VREF AD LOW
I/O (AD IN)
VIDEO + SYNC PROCESSOR
ERR 15
ERR 45
SYS1
SYS2
PALBG
NTSCM
K88 I/O-CONTR-BUS
Y+C-FRONT-INPUT K33
Y/CVBS-FRONT-INPUT K34
C-FRONT-INPUT K35
SNDL-FRONT-INPUT K36
SNDR-FRONT-INPUT K37
K38 SNDR-SC1-OUTPUT
K39 SNDL-SC1-OUTPUT
SNDR-SC1-INPUT K42
SNDL-SC1-INPUT K43
B-SC1-INPUT K46
G-SC1-INPUT K47
R-SC1-INPUT K48
FBL-SC1-INPUT K49
CVBS-SC1-INPUT K50
K40 SNDR-SC2-OUTPUT
K41 SNDL-SC2-OUTPUT
K52 Y/Y+C/CVBS-SC2-OUTPUT
CVBS-TERR
CVBS-SAT
+8V5-FRONT
CONSTANT LEVEL
STATUS 1
IO-CONTR-BUS
HDISP

	SYS1	SYS2
PALBG	0	1
NTSCM	1	0

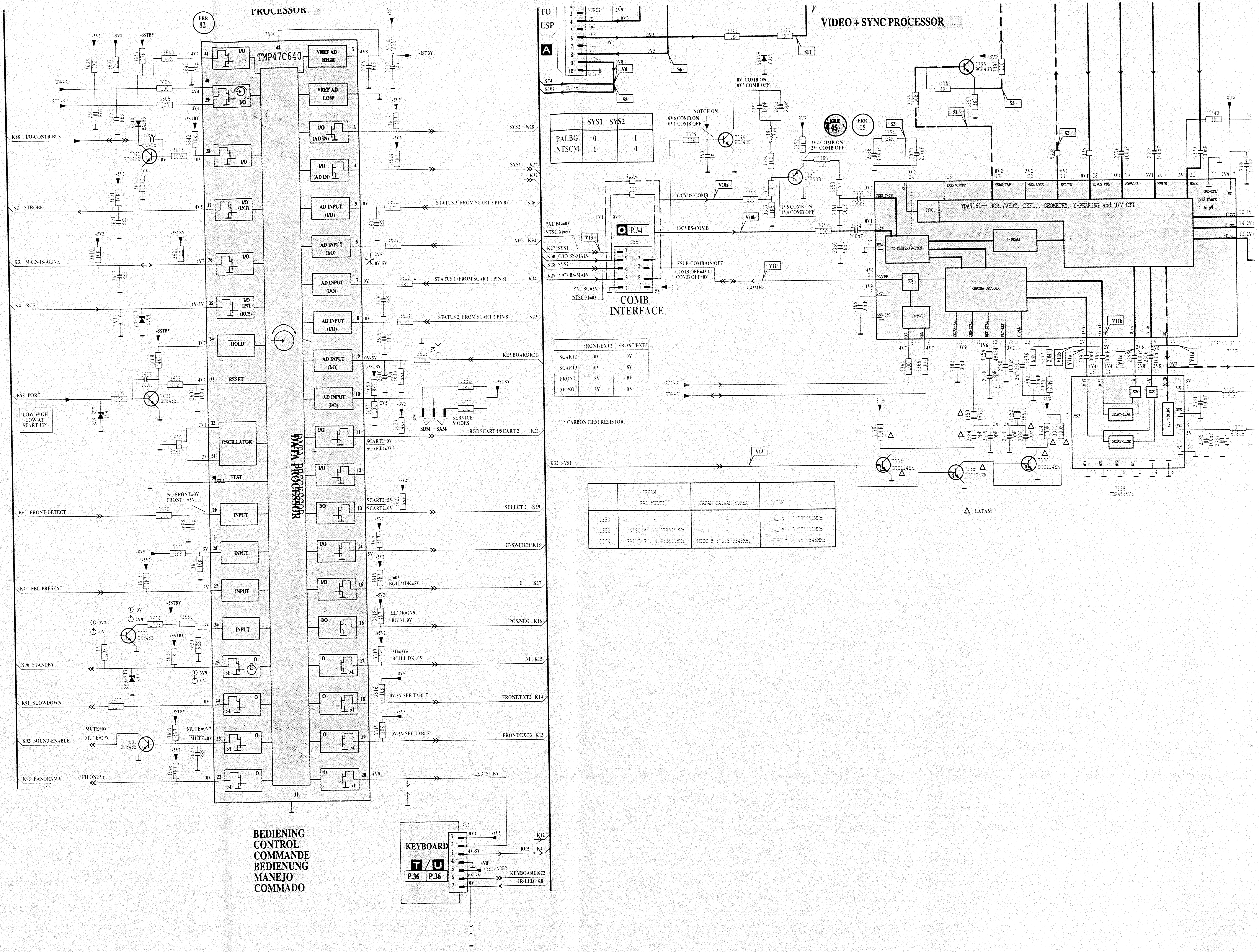
3472	E22
3473	H29
3474	C42
3475	F40
3476	E17
3477	K40
3478	I38
3479	E17
3480	C43
3481	B44
3482	D17
3483	D27
3484	C27
3485	D27
3486	D27
3487	F28
3488	I32
3489	J32
3490	F16
3491	H41
3492	H42
3493	D46
3496	H42
3497	G42
3498	G42
3499	H43
3500	G42
3503	E44
3504	E44
3505	E45
3506	D18
3507	E19
3508	P39
3509	C17
3510	P39
3511	S32
3512	R32
3513	S33
3514	R33
3515	R34
3516	S34
3517	V35
3518	P43
3519	R32
3520	P32
3521	X37
3522	X38
3523	P32
3524	X34
3525	P32
3526	P33
3527	P33
3528	P33
3529	O34
3530	M34
3531	O32
3532	X36
3533	N32
3534	W37
3535	U38
3536	N32
3537	O34
3538	N33
3539	O34
3540	S44
3541	S44
3542	T44
3543	T44
3544	U44
3546	S43
3547	X35
3548	X36
3549	U44
3550	W43
3551	W42
3552	W43
3554	X43
3555	X44
3556	X44
3557	V42
3558	O37
3559	M39
3560	N39
3561	Q35
3562	R36
3563	O34
3564	P36
3565	Q36
3600	M31
3601	Q 4
3602	R 9
3603	T 5
3604	O 5
3605	O 5
3606	N 3
3607	N 4
3608	T 5
3609	T 4
3610	R 3
3611	Q 9
3612	R 9
3613	T10
3614	S 9
3615	AA 9
3616	Z 9
3617	Y 9
3618	Y 9
3619	X 9
3620	W 9
3621	V 9
3622	R 5
3623	U 9
3624	P 9
3625	O 9
3626	AA 5
3627	AA 5
3628	Y 5
3629	Y 5
3630	W 5
3631	W 5
3632	Z 4
3633	X 4
3634	Y 5
3635	T 9
3636	X 5
3637	Y 3
3640	N 5
3641	N 4
3642	P 5
3643	P 5
3644	Q 4
3650	T 9
3651	U 9
3652	T10
3653	U10
3660	X 5
4000	E 7
4233	Q13
4234	Q13
4235	Q29
4237	R29
4249	O32
4403	F37
4404	G38
4480	E40
4484	C29
4500	W40
4501	Y29
4503	P35
4512	K 5
4513	K 5
5000	C 5
5378	U25
5380	U25
5381	O26
5382	P16
5383	P17
5500	V43
5501	N33
5600	N 9
5601	M31
6003	G 5
6004	C 7
6302	N16
6303	O26
6400	J21
6401	I21
6402	H21
6403	H21
6404	F33
6405	G26
6406	G20
6407	E20
6408	E21
6409	F25
6410	F19
6411	D20
6412	C21
6413	F27
6414	K40
6415	B18
6416	B19
6417	B19
6418	C19
6419	A20
6420	A21
6421	B21
6422	B21
6423	A24
6424	A25
6425	B25
6426	C25
6427	A27
6428	B26
6429	B26
6430	C26
6431	D27
6432	D26
6433	F27
6434	B33
6435	B33
6436	B33
6437	B33
6438	D25
6520	V43
6521	V43
6522	V43
6523	X37
6526	W35
6540	V44
6546	S43
6640	O 4
6641	U 4
6642	S 4
6643	Z 4
7001	B 8
7352	T24
7354	V18
7355	V20
7356	V21
7358	V22
7390	P26
7395	O20
7396	P15
7397	O17
7400	K41
7401	G44
7402	E18
7403	E44
7404	D45
7405	G41
7406	F42
7407	H32
7408	D17
7409	H42
7411	K38
7412	C45
7413	C45
7415	E17
7416	F17
7500	Q42
7501	S33
7502	R34
7503	P33
7504	Q34
7505	N33
7506	Q37
7518	P42
7536	X37
7538	W43
7539	X44
7540	W42
7580	L35
7600	N 7
7601	T 5
7602	AA 4
7603	Y 4
7640	P 4
9235	Q29
9258	M32
9308	P21
9375	P22
9403	G38
9404	G37
9488	E28
9493	F22
9494	F27
9496	D34
9532	P35
9533	R36
9534	R36
S10	I 1
S11	M13
S15	K 1
S33	A10
S40	R46
S41	AB10
S46	G11
S47	G14
S48	N31
S49	N31
S51	W30
S52	Y30
S53	W33
S55	R13
S56	K 7
S57	M41
S59	C14
S65	P29
S98	U 9
V1	X34
V2	AB 9
V3	S 4
V4	T10
V5	AD10


K
BRONKEUZE
SOURCE SELECT
SELECTION SOURCE
SIGNALENQUELLENWAHL
SELLECION DE FUENTE
SELEZIONE SORGENTI
EXT2
SC2 UP/DOWN
EXT3
SC3
MATRIX
TEA6415C
4 OF 8 DECODER
1 OF 4 DECODER
HEF4052
LINE TRANSIENT PROCESSOR
PIN-TO-IIC INTERFACE
IIC CONTR
6-BIT ADC
SANDCASTLE DETECTOR
CONTOUR PROCESSOR
BLACK INSERTION CLAMP
DELAY
CLAMPS
STEP IMPR PROC
SMART SHARPN CONTR
STEEPN CORING PAEKING
TXT
P.20
ERR 45
ERR 81
ERR 64
ERR 28
WITHOUT POTMETER
NOT FOR P50
SCART1=0V
SCART1=3V5
TDA8601
FBL-PRESENT
TXT-KILL
VIDEO CONTROLLER
Y/CVBS-PIP
C-PIP
Y/CVBS-MAIN
C/CVBS-MAIN
R-SC-INPUT
G-SC-INPUT
B-SC-INPUT
FBL-SC-INPUT
STATUS 2
STATUS 3
FRONT/EXT2
FRONT/EXT3
RGB SCART 1/SCART 2
I/O CONTR BUS

*	P50	NP50
3483	150E	75E
3431	75E	150E
4480		X
9480	X	

	FRONT/EXT2	FRONT/EXT3
SCART2	0V	0V
SCART3	0V	8V
FRONT	8V	0V
MONO	8V	8V

**	NLTP	LTP
2503	39pF	---
2507	39pF	---
2511	120pF	---
2513	15pF	---
3515	680 1%	680
3528	680 1%	680
3539	470 1%	0
3561	0	---
3562	0	---
3563	0	---
4503	0	---
7580	---	TDA9177
9532	---	0


PROCESSOR
ERR 82
TMP47C640
DATA PROCESSOR
VREF AD HIGH
VREF AD LOW
I/O
AD INPUT (I/O)
I/O (AD IN)
I/O (INT)
I/O (INT) (RC5)
HOLD
RESET
OSCILLATOR
TEST
INPUT
K88 I/O-CONTR-BUS
K2 STROBE
K3 MAIN-IS-ALIVE
K4 RC5
K95 PORT
LOW-HIGH LOW AT START-UP
K6 FRONT-DETECT
NO FRONT=0V FRONT =5V
K7 FBL-PRESENT
K96 STANDBY
K91 SLOWDOWN
K92 SOUND-ENABLE
MUTE=0V MUTE=29V
MUTE=0V7 MUTE=0V
K93 PANORAMA (1FH ONLY)
SYS2 K28
SYS1 K27 K32
STATUS 3 (FROM SCART 3 PIN 8) K26
AFC K94
STATUS 1 (FROM SCART 1 PIN 8) K24
STATUS 2 (FROM SCART 2 PIN 8) K23
KEYBOARD K22
SERVICE MODES
SDM SAM
RGB SCART 1/SCART 2 K21
SCART1=0V SCART1=3V5
SCART2=5V SCART2=0V
SELECT 2 K19
IF-SWITCH K18
L'=0V BGILMDK=5V
L' K17
LL'DK=2V9 BGIM=0V
POS/NEG K16
MI=3V6 BGILL'DK=0V
M K15
0V/5V SEE TABLE
FRONT/EXT2 K14
FRONT/EXT3 K13
LED (ST-BY)
+5STBY
SDA-S
SCL-S
KEYBOARD
T / U
P.36 P.36
RC5 K4
KEYBOARD K22
IR-LED K8
K12
TO LSP
K74 K102
SC2FH
V6 S8 S6 S11
COMB INTERFACE
Q P.34
PAL BG=0V NTSC M=5V
K27 SYS1
K30 C/CVBS-MAIN
K28 SYS2
K29 Y/CVBS-MAIN
PAL BG=5V NTSC M=0V
Y/CVBS-COMB
C/CVBS-COMB
FSUB-COMB-ON/OFF
COMB OFF=4V1 COMB OFF=0V
V10a V10b V12 V13
4.43MHz
NOTCH ON
0V6 COMB ON 0V1 COMB OFF
0V COMB ON 0V3 COMB OFF
2V2 COMB ON 2V COMB OFF
1V6 COMB ON 1V4 COMB OFF
ERR 45
ERR 15
VIDEO + SYNC PROCESSOR
TDA9161 — HOR./VERT.-DEFL., GEOMETRY, Y-PEAKING and U/V-CTI
SYNC.
Y-DELAY
CHROMA DECODER
CONTROL
DELAY-LINE
PLL-TIMING
p15 short to p9
K32 SYS1
S1 S2 S3 S5
V11a V11b V11c V11d
TDA4665V3
LATAM

	SYS1	SYS2
PALBG	0	1
NTSCM	1	0

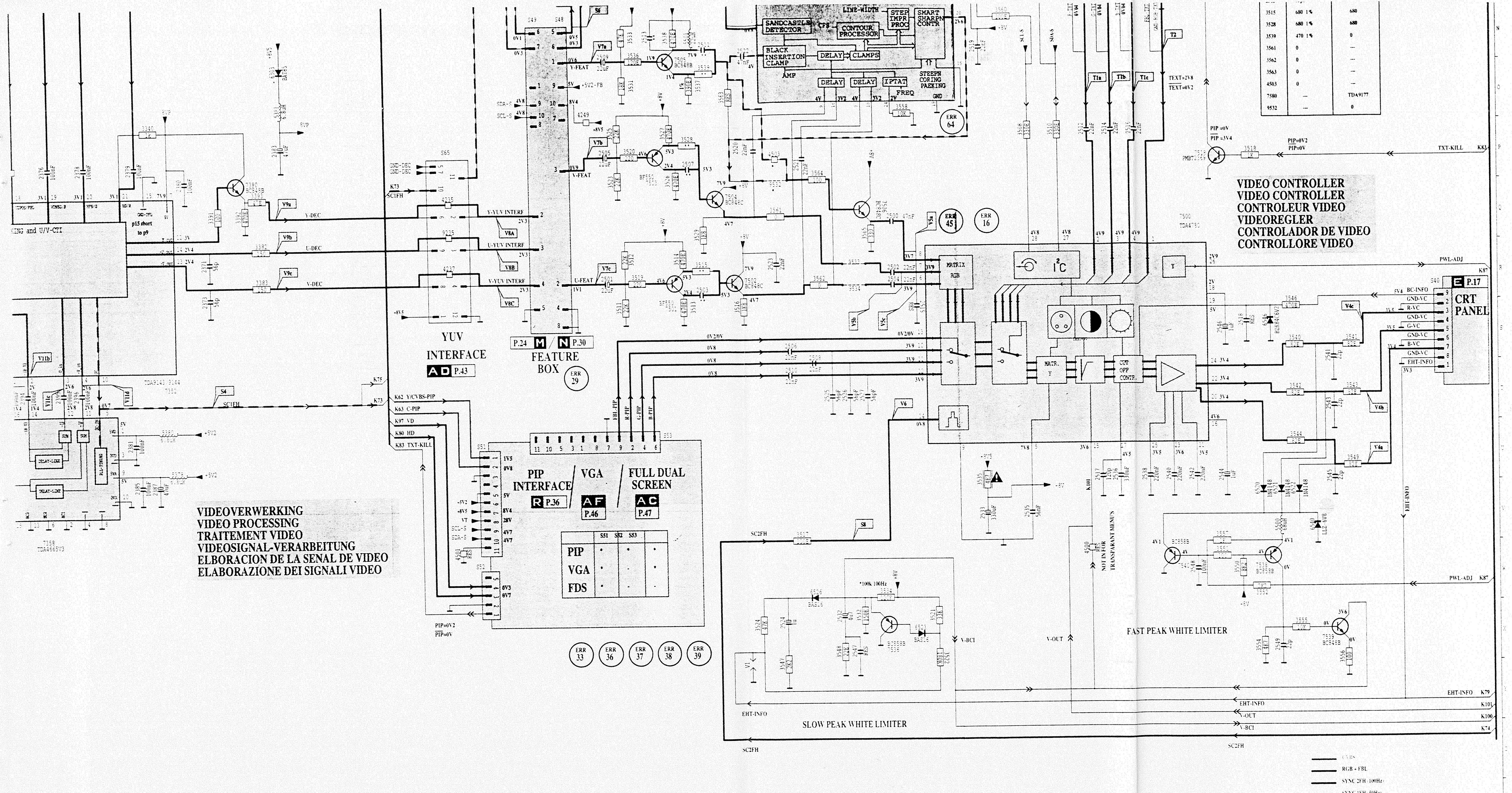
	FRONT/EXT2	FRONT/EXT3
SCART2	0V	0V
SCART3	0V	8V
FRONT	8V	0V
MONO	8V	8V

* CARBON FILM RESISTOR

	SECAM PAL MULTI	JAPAN TAIWAN KOREA	LATAM
1350	-	-	PAL N : 3.582056MHz
1352	NTSC M : 3.579545MHz	-	PAL M : 3.575611MHz
1354	PAL B G : 4.433619MHz	NTSC M : 3.579545MHz	NTSC M : 3.579545MHz

△ LATAM

BEDIENING
CONTROL
COMMANDE
BEDIENUNG
MANEJO
COMMADO

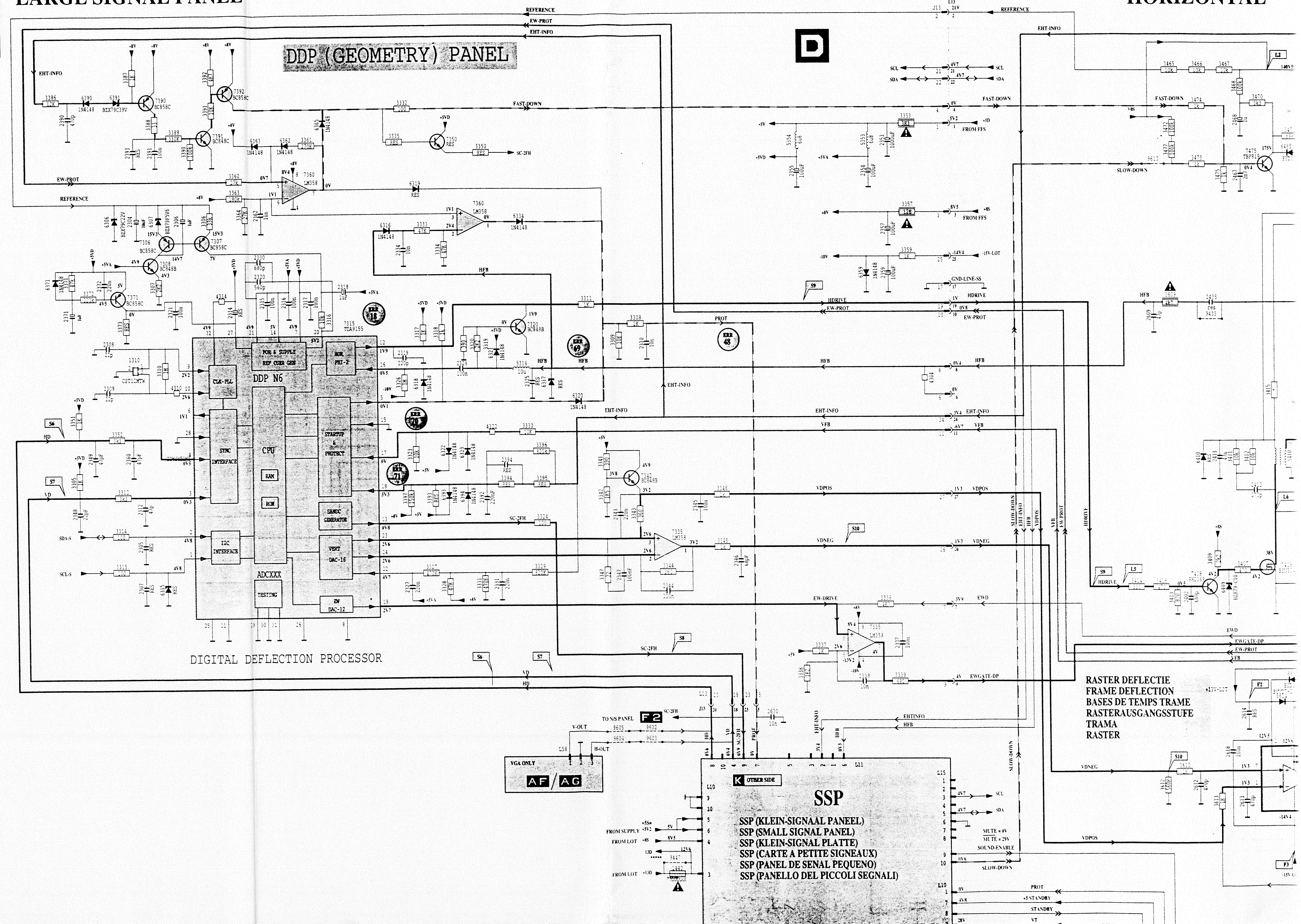

VIDEOVERWERKING
VIDEO PROCESSING
TRAITEMENT VIDEO
VIDEOSIGNAL-VERARBEITUNG
ELBORACION DE LA SENAL DE VIDEO
ELABORAZIONE DEI SEGNALI VIDEO
VIDEO CONTROLLER
VIDEO CONTROLLER
CONTROLEUR VIDEO
VIDEOREGLER
CONTROLADOR DE VIDEO
CONTROLLORE VIDEO
YUV INTERFACE
AD P.43
FEATURE BOX
P.24 M / N P.30
PIP INTERFACE
R P.36
VGA
AF P.46
FULL DUAL SCREEN
AC P.47
CRT PANEL
E P.17
SANDCASTLE DETECTOR
CPS
LINE-WIDTH
CONTOUR PROCESSOR
STEP IMPR PROC
SMART SHARPN CONTR
BLACK INSERTION CLAMP
AMP
DELAY
CLAMPS
DELAY
DELAY
IPTAT
FREQ
STEEPN CORING PAEKING
GND
MATRIX RGB
MATR. Y
CUT OFF COMP.
FAST PEAK WHITE LIMITER
SLOW PEAK WHITE LIMITER
NOT IN FOR TRANSPARANT MENUS
TDA9143/9144
TDA4665V3
TDA4780
Y-DEC
U-DEC
V-DEC
Y-YUV INTERF
U-YUV INTERF
V-YUV INTERF
Y-FEAT
V-FEAT
U-FEAT
SC1FH
SC2FH
K62 Y/CVBS-PIP
K63 C-PIP
K97 VD
K80 HD
K83 TXT-KILL
FBL-PIP
R-PIP
G-PIP
B-PIP
TXT-KILL
PWL-ADJ K87
BC-INFO
R-VC
G-VC
B-VC
GND-VC
EHT-INFO
EHT-INFO K79
EHT-INFO K101
V-OUT K100
V-BCI K74
TEXT=2V8
TEXT=0V2
PIP=0V
PIP=3V4
PIP=0V2
PIP=0V
ERR 64
ERR 45
ERR 16
ERR 29
ERR 33
ERR 36
ERR 37
ERR 38
ERR 39
CVBS
RGB - FBL
SYNC 2FH (100Hz)
SYNC 1FH (50Hz)
PROTECTION ERROR
NON-PROTECTION ERROR

3515	680 1%	680
3528	680 1%	680
3539	470 1%	0
3561	0	—
3562	0	—
3563	0	—
4503	0	—
7580	—	TDA9177
9532	—	0

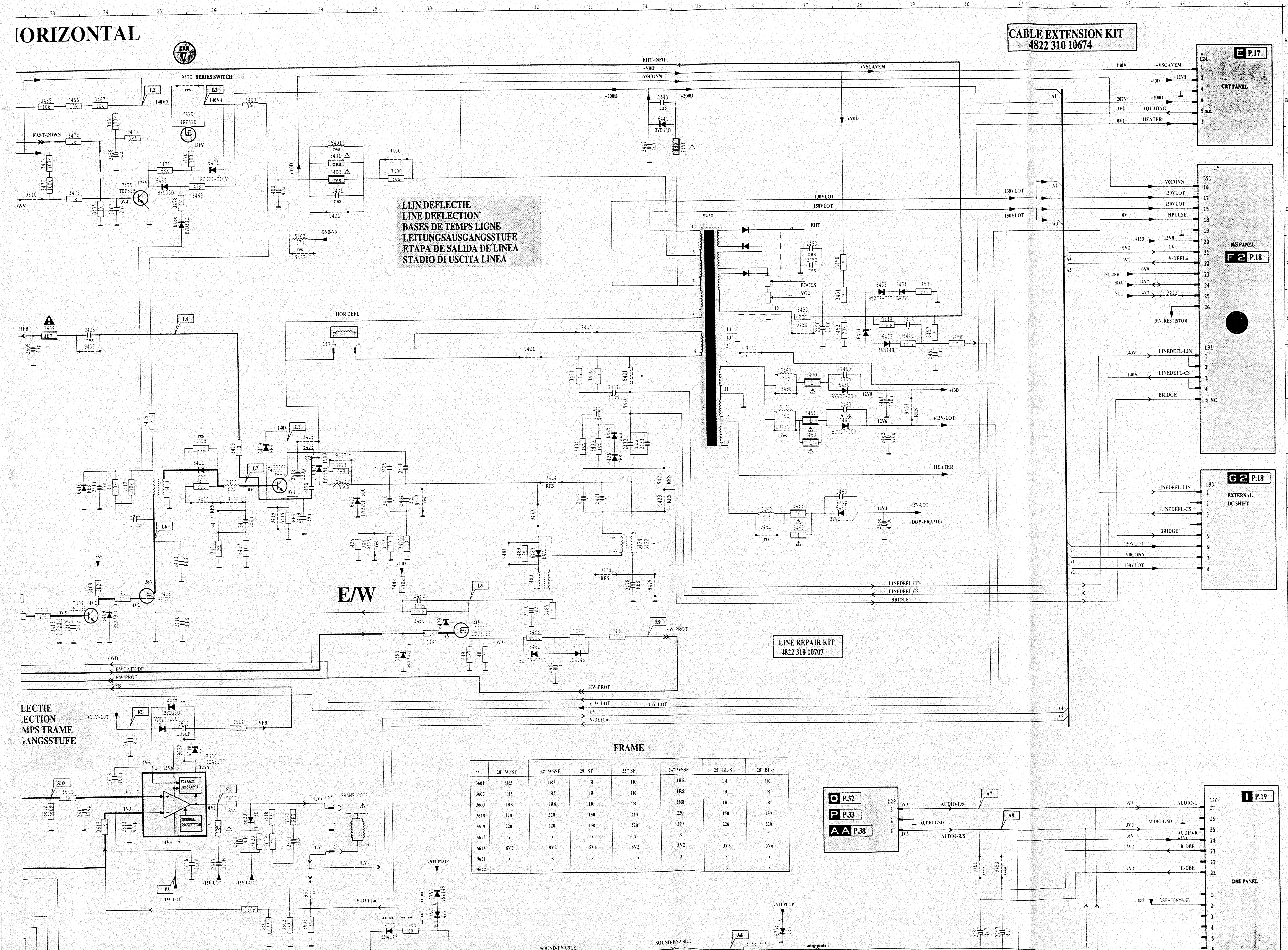
A

LARGE SIGNAL PANEL

HORIZONTAL


DDP (GEOMETRY) PANEL
D
REFERENCE
EW-PROT
EHT-INFO
FAST-DOWN
SC-2FH
HFB
HDRIVE
PROT
DDP N6
CLK-PLL
POR & SUPPLY REF CURR GEN
HOR PHI-2
SYNC INTERFACE
CPU
RAM
ROM
STARTUP & PROTECT
SANDC GENERATOR
I2C INTERFACE
VERT DAC-16
ADCXXX
TESTING
EW DAC-12
DIGITAL DEFLECTION PROCESSOR
7315 TDA9155
7360 LM358
7335 LM358
ERR 18
ERR 69
ERR 48
ERR 70
ERR 71
SDA-S
SCL-S
HD
VD
VDPOS
VDNEG
VFB
EW-DRIVE
EWGATE-DP
SLOW-DOWN
FROM FFS
GND-LINE-SS
TO N/S PANEL
F2
V-OUT
H-OUT
VGA ONLY
AF / AG
SSP
K OTHER SIDE
SSP (KLEIN-SIGNAAL PANEEL)
SSP (SMALL SIGNAL PANEL)
SSP (KLEIN-SIGNAL PLATTE)
SSP (CARTE A PETITE SIGNEAUX)
SSP (PANEL DE SENAL PEQUENO)
SSP (PANELLO DEL PICCOLI SEGNALI)
FROM SUPPLY
FROM LOT
MUTE = 0V
MUTE = 29V
SOUND-ENABLE
+5 STANDBY
STANDBY
RASTER DEFLECTIE
FRAME DEFLECTION
BASES DE TEMPS TRAME
RASTERAUSGANGSSTUFE
TRAMA
RASTER
EWD
EW-PROT
FB

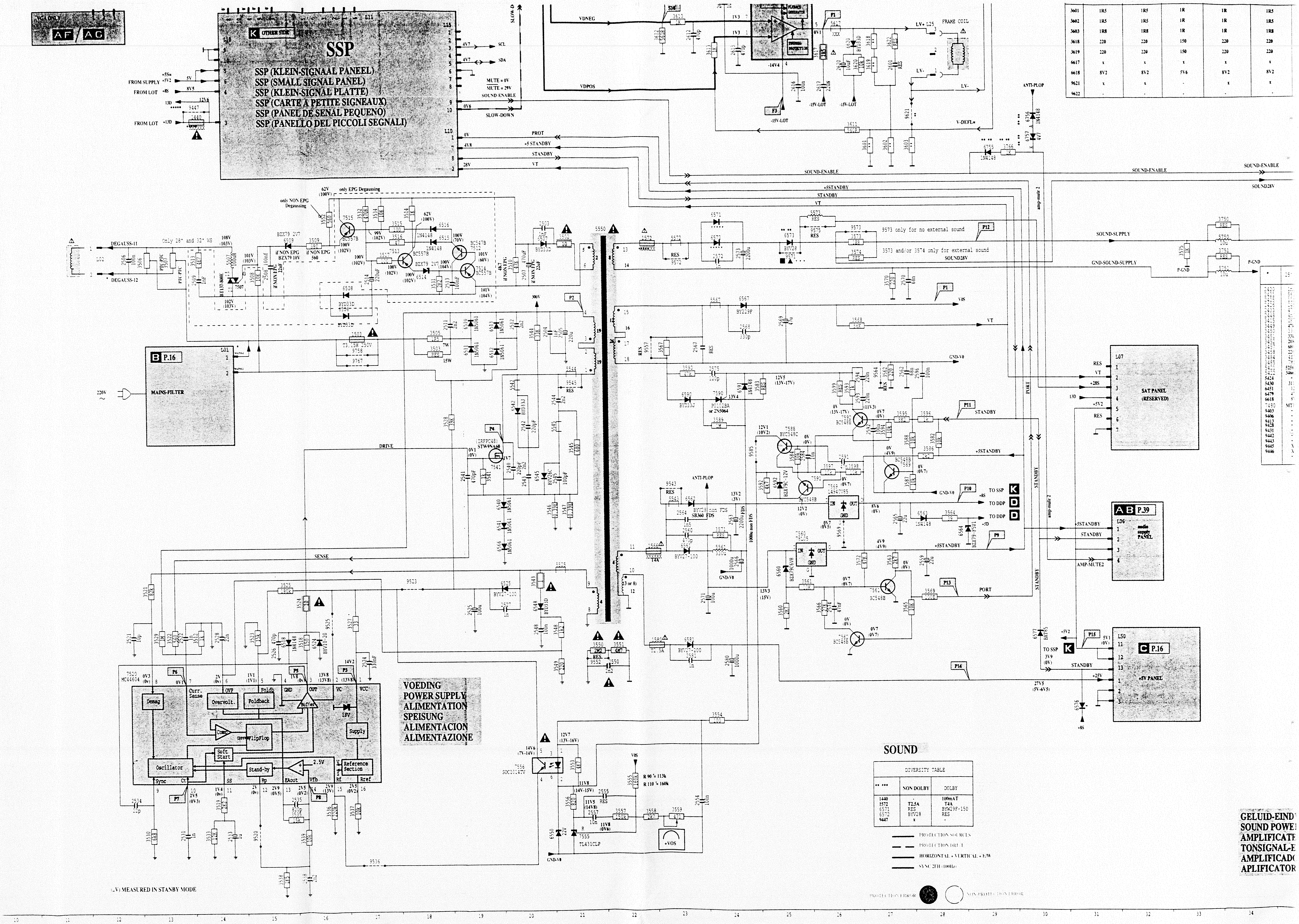
[ORIZONTAL



CABLE EXTENSION KIT
4822 310 10674
LIJN DEFLECTIE
LINE DEFLECTION
BASES DE TEMPS LIGNE
LEITUNGSAUSGANGSSTUFE
ETAPA DE SALIDA DE LINEA
STADIO DI USCITA LINEA
E/W
LINE REPAIR KIT
4822 310 10707
LECTIE
LECTION
MPS TRAME
GANGSSTUFE
FRAME
9470 SERIES SWITCH
EHT-INFO
+V0D
V0CONN
+VSCAVEM
+200D
HOR DEFL
EHT
FOCUS
VG2
HEATER
130VLOT
150VLOT
LINEDEFL-LIN
LINEDEFL-CS
BRIDGE
EW-PROT
EWD
EWGATE-DP
FB
+13V-LOT
LV-
V-DEFL=
-15V-LOT
FRAME COIL
ANTI-PLOP
SOUND-ENABLE
CRT PANEL
E P.17
NS PANEL
F2 P.18
G2 P.18
EXTERNAL DC SHIFT
DIV. RESTISTOR
I P.19
DBE-PANEL
O P.32
P P.33
AA P.38
AUDIO-L/S
AUDIO-GND
AUDIO-R/S
FLYBACK GENERATOR
THERMAL PROTECTION
HFB
FAST-DOWN
GND-V0

FRAME

**	28" WSSF	32" WSSF	29" SF	25" SF	24" WSSF	25" BL-S	28" BL-S
3601	1R5	1R5	1R	1R	1R5	1R	1R
3602	1R5	1R5	1R	1R	1R5	1R	1R
3603	1R8	1R8	1R	1R	1R8	1R	1R
3618	220	220	150	220	220	150	150
3619	220	220	150	220	220	220	220
6617	x	x	x	x	x	-	-
6618	8V2	8V2	5V6	8V2	8V2	3V6	3V6
9621	x	x	-	x	x	x	x
9622	-	-	-	-	-	x	x


VGA ONLY
AF / AC
SSP
K OTHER SIDE
SSP (KLEIN-SIGNAAL PANEEL)
SSP (SMALL SIGNAL PANEL)
SSP (KLEIN-SIGNAL PLATTE)
SSP (CARTE A PETITE SIGNEAUX)
SSP (PANEL DE SENAL PEQUENO)
SSP (PANELLO DEL PICCOLI SEGNALI)
FROM SUPPLY
FROM LOT
SCL
SDA
MUTE = 0V
MUTE = 29V
SOUND-ENABLE
SLOW-DOWN
SLOW-D
PROT
+5 STANDBY
STANDBY
VT
VDNEG
VDPOS
FRAME COIL
V-DEFL
ANTI-PLOP
SOUND-ENABLE
+5STANDBY
SOUND28V
only EPG Degaussing
only NON EPG Degaussing
Only 28" and 32" WS
DEGAUSS-11
DEGAUSS-12
9573 only for no external sound
3573 and/or 3574 only for external sound
SOUND-SUPPLY
GND-SOUND-SUPPLY
P-GND
amp-mute 2
B P.16
MAINS-FILTER
220V ~
DRIVE
SENSE
T3.15H 250V
GND-V0
RES
VT
+28S
13D
+5V2
L07
SAT PANEL (RESERVED)
TO SSP
TO DDP
AB P.39
L06
audio supply PANEL
AMP-MUTE2
PORT
C P.16
L50
+5V PANEL
+8S
7520 MC44604
Demag
Curr. Sense
Overvolt.
Foldback
Buffer
Supply
Comp
FlipFlop
Soft Start
Oscillator
Stand-by
Reference Section
VOEDING
POWER SUPPLY
ALIMENTATION
SPEISUNG
ALIMENTACION
ALIMENTAZIONE
7556 SOC1C147V
7555 TL431CLP
R 90° = 113k
R 110° = 160k
+VOS
(..V) MEASURED IN STANBY MODE
SOUND

3601	1R5	1R5	1R	1R	1R5
3602	1R5	1R5	1R	1R	1R5
3603	1R8	1R8	1R	1R	1R8
3618	220	220	150	220	220
3619	220	220	150	220	220
6617	x	x	x	x	x
6618	8V2	8V2	5V6	8V2	8V2
9621	x	x	-	x	x
9622	-	-	-	-	-

*	25
2420	[illegible]
2421	[illegible]
2425	[illegible]
2426	[illegible]
2433	4
2448	4n
3415	[illegible]
3449	47k
3450	[illegible]
3451	33k
3452	20k
3457	68
3458	22
3484	4E
3485	[illegible]
5421	5256
5422	3466
5424	-
5430	31
6451	1
6479	4
6618	8V
7480	MT
9403	-
9406	-
9413	-
9428	-
9431	-
9442	-
9443	-
9445	X
9446	X

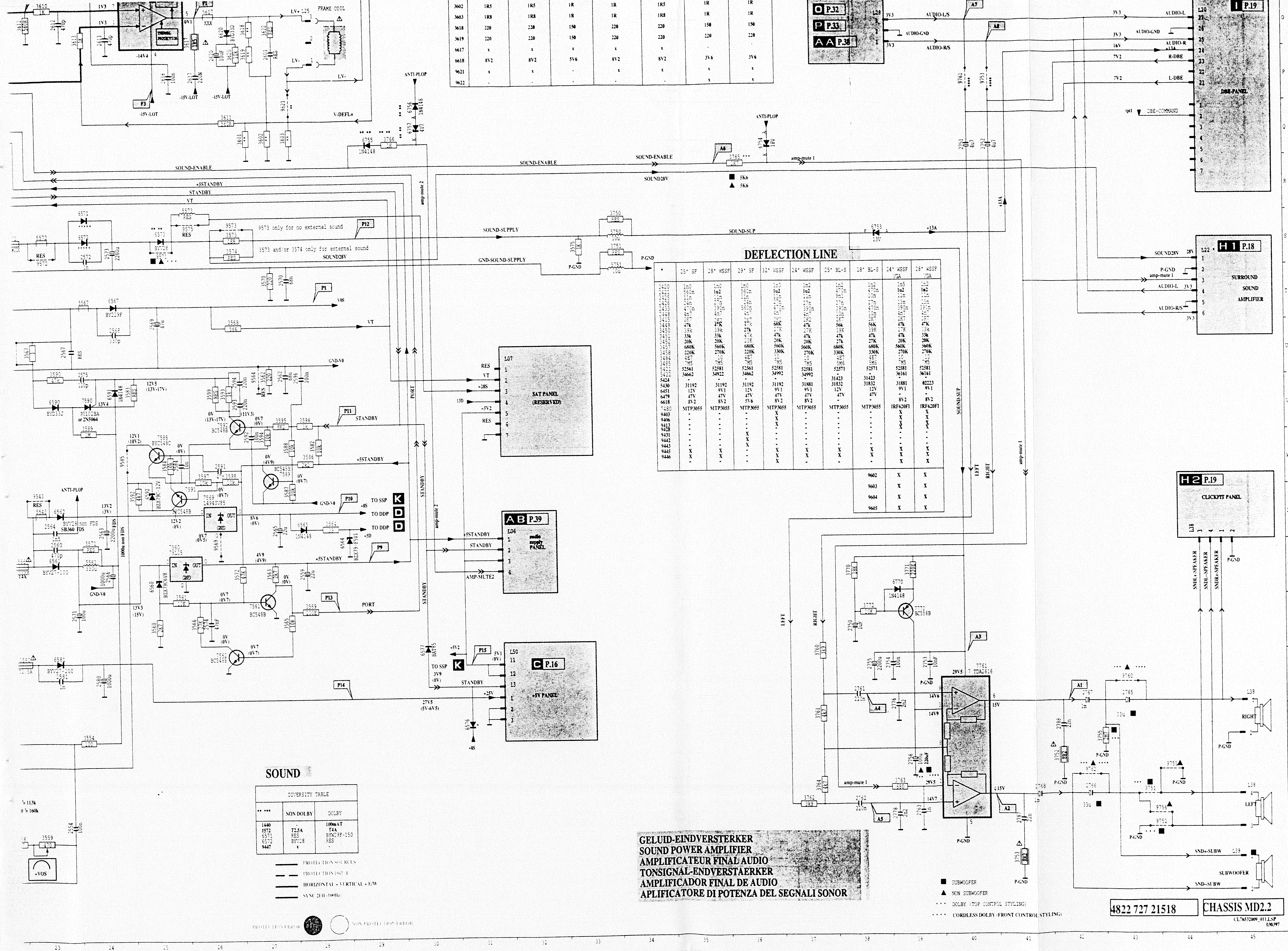
SOUND

DIVERSITY TABLE		
** ***	NON DOLBY	DOLBY
1440	-	100mAT
1572	T2.5A	T4A
6571	RES	BYW29F-150
6572	BYV28	RES
9447	x	-

PROTECTION SOURCES
PROTECTION DRI…T
HORIZONTAL + VERTICAL + E/W
SYNC 2FH (100Hz)

● PROTECTION ERROR
○ NON-PROTECTION ERROR

GELUID-EIND
SOUND POWE
AMPLIFICATE
TONSIGNAL-E
AMPLIFICADO
APLIFICATOR


FRAME COIL
THERMAL PROTECTION
-15V-LOT
V-DEFL
ANTI-PLOP
SOUND-ENABLE
+5STANDBY
STANDBY
VT
SOUND-SUPPLY
SOUND-SUP
GND-SOUND-SUPPLY
SOUND28V
P-GND
+13A
amp-mute 1
amp-mute 2
9573 only for no external sound
3573 and/or 3574 only for external sound
GND-V0
VOS
PORT
SAT PANEL (RESERVED)
audio supply PANEL
+5V PANEL
TO SSP
TO DDP
DBE-PANEL
DBE-COMMAND
AUDIO-L
AUDIO-R
AUDIO-GND
R-DBE
L-DBE
SURROUND SOUND AMPLIFIER
CLICKFIT PANEL
SND+-SPEAKER
SND--SPEAKER
TDA2616
RIGHT
LEFT
SUBWOOFER
SND+-SUBW
SND--SUBW

3602	1R5	1R5	1R	1R	1R5	1R	1R
3603	1R8	1R8	1R	1R	1R8	1R	1R
3618	220	220	150	220	220	150	150
3619	220	220	150	220	220	220	220
6617	x	x	x	x	x	-	-
6618	8V2	8V2	5V6	8V2	8V2	3V6	3V6
9621	x	x	-	x	x	x	x
9622	-	-	-	-	-	x	x

DEFLECTION LINE

*	25" SF	28" WSSF	29" SF	32" WSSF	24" WSSF	25" BL-S	28" BL-S	24" WSSF VGA	28" WSSF VGA
2420	1n0	1n0	1n0	1n0	1n2	1n2	1n2	1n5	1n2
2421	560n	1u2	560n	1u2	1u2	470n	470n	1u2	1u2
2425	11n	11n	11n	11n	11n	9n1	10n	11n	11n
2426	24n	27n	24n	27n	27n	27n	27n	13n	13n
2433	470n	390n	560n	470n	390n	390n	470n	390n	390n
2448	4n7	4n7	4n7	4n7	4n7	10n	10n	4n7	4n7
3415	2K7	2K2	2K7	2K2	2K2	2K7	2K7	2K7	2K7
3449	47k	47K	47k	68K	47k	56k	56K	47k	47K
3450	39k	39k	27k	27K	27K	39K	39K	27K	39k
3451	33k	33k	47k	47k	47k	47k	47k	47k	33k
3452	20K	20K	20K	20K	20K	27k	27K	20K	20K
3457	680K	560K	680K	560K	560K	680K	680K	560K	560K
3458	220K	270K	220K	330K	270K	330K	330K	270K	270K
3484	4E7	10	4E7	10	10	4E7	4E7	10	10
3485	7M5	7M5	7M5	7M5	7M5	5M6	5M6	7M5	7M5
5421	52561	52581	52561	52581	52581	52571	52571	52581	52581
5422	34662	34922	34662	34992	34992	-	-	36161	36161
5424	-	-	-	-	-	31423	31423	-	-
5430	31192	31192	31192	31192	31881	31832	31832	31881	02223
6451	12V	9V1	12V	9V1	9V1	12V	12V	9V1	9V1
6479	47V	47V	47V	47V	47V	47V	47V	-	-
6618	8V2	8V2	5V6	8V2	8V2	-	-	8V2	8V2
7480	MTP3055	MTP3055	MTP3055	MTP3055	MTP3055	MTP3055	MTP3055	IRF620FI	IRF620FI
9403	-	-	-	X	-	-	-	X	X
9406	-	-	-	X	-	-	-	X	X
9413	-	-	-	X	-	-	-	X	X
9428	-	-	-	-	-	-	-	X	X
9431	-	-	X	-	-	-	-	-	-
9442	-	-	X	-	-	-	-	-	-
9443	-	-	X	-	-	-	-	-	-
9445	X	X	-	X	X	X	X	X	X
9446	X	X	-	X	X	X	X	X	X
	-	-	-	X	-	-	-	X	X

9602	X	X
9603	X	X
9604	X	X
9605	X	X

SOUND

DIVERSITY TABLE		
** ***	NON DOLBY	DOLBY
1440	-	100mAT
1572	T2.5A	T4A
6571	RES	BYW29F-150
6572	BYV28	RES
9447	x	-

PROTECTION SOURCES

PROTECTION DRIVE

HORIZONTAL + VERTICAL + E/W

SYNC 2FH (100Hz)

PROTECTION ERROR ● ○ NON-PROTECTION ERROR

GELUID-EINDVERSTERKER
SOUND POWER AMPLIFIER
AMPLIFICATEUR FINAL AUDIO
TONSIGNAL-ENDVERSTAERKER
AMPLIFICADOR FINAL DE AUDIO
APLIFICATORE DI POTENZA DEL SEGNALI SONOR

■ SUBWOOFER

▲ NON SUBWOOFER

··· DOLBY (TOP CONTROL STYLING)

···· CORDLESS DOLBY (FRONT CONTROL STYLING)

4822 727 21518

CHASSIS MD2.2

CL76532009_011.LSP
030397

Der zuletzt aufgetretene Fehler wird ganz links in der Zeile "Code 2" (Fehler 2) angezeigt. Ein Fehler wird mit einer 3stelligen Zahl angegeben. Wenn weniger als 10 Fehler aufgetreten sind, ist der Rest der Zeile(n) leer. Sind keine Fehler aufgetreten, erscheint die Mitteilung "Keine Fehler".

Erklärung der Fehlerkodes:

Error	Device	Description	Item	Panel	Defective module indication in SAM	Diagram
0	no error		-	-	No errors	x
4	ST24C16B1	NVM EAROM 2048 bytes	7201	SSP	Control	K
6	UV916S	Tuner	1100	SSP	Tuner	K
15	TDA914X	Video + sync processor	7352	SSP	Video processing (SSP)	K
16	TDA4780	Video controller	7500	SSP	Video control	K
28	SAA5270	TXT processor	7400	TXT	Teletext	J
29	PCF83CE652_ featurebox	FBX microprocessor	7505	FBX	Feature box	M
33	SDA9288_2_pip2	PIP-processor	7788	PIP	PIP	S
34	UV12xx	PIP or DW tuner	1775 / E9F1	PIP / DW	PIP / Video DualScreen	S / AC
36	PCF8574_pip	I/O-expander for PIP forced colour	7860	PIP	PIP	S
37	SAB9077H_dwi	PIPO (Picture In Picture Out)	IC9A	Video DualScreen	Video DualScreen	AC
38	PCF8574_dwi	I/O-expander for DW	IC9N	Video DualScreen	Video DualScreen	AC
39	TDA914x_dwi	Video + Sync processor for DW	IC9J	Video DualScreen	Video DualScreen	AC
58	TDA9860_vds	Sound processor on Dolby Audio Module for Video DualScreen	7590	Dolby Audio Module	Audio module	P
64	TDA9177_LTP	Line Transient Processor	7580	SSP	Video control / picture signal imrpov.	K
65	PCF8574A_HDI	I/O-expander for VGA	7180	VGA	VGA module	AF
79	TDA9860_DW	Sound processor for DW	-	-	-	AC
80	MSP3400/3410	FM/NICAM decoder and audio source select	7353	Audio module	Audio module	O/P
81	TEA6415	Source select video matrix	7406	SSP	Source select	K
82	TMP47C640/840	Standby(I/O)-processor	7600	SSP	Standby processor	K
85	SAA7710T	Dolby processor	7600	Dolby audio	Audio module	O/P
86	PCF8574A	I/O-expander for frame rotation	7050	N/S + ROT	Rotation panel	F2
88	TSA5520	Wireless dolby	1403	Wireless dolby trans	Dolbt transmitter	AE1

Für weitere Angaben wird auf Kapitel 6 der "Serviceanleitung MD2.21E/MD2.22E/MD2.23E, Best. Nr.: 4822 727 21486" verwiesen.

Zeile 4: PP Volume; zeigt den Wert für die persönliche Lautstärkevoreinstellung an, die der Benutzer vorgenommen hat (PP-Taste).
Der Wert kann variieren von 0 (kleinste Lautstärke) bis 24 (größte Lautstärke). Die persönliche Lautstärkevoreinstellung kann mit dem Menü "Sonderfunktionen" geändert und gespeichert werden. Mit der Lautstärketaste auf der Fernbedienung kann die Lautstärke jederzeit geändert werden.

Zeile 5: PP Colour; zeigt den Wert für die persönliche Farbsättigungsvoreinstellung an, die der Benutzer vorgenommen hat (PP-Taste).
Der Wert kann variieren von 0 (keine Farbe) bis 63 (größte Farbsättigung). Die persönliche Farbsättigungsvoreinstellung kann mit dem Menü "Sonderfunktionen" geändert und gespeichert werden.
Die Farbsättigungseinstellung kann jederzeit geändert werden. Hierzu zunächst die rote Taste auf der Fernbedienung für das Bild-Menü drücken, dann "Farbesättigung" wählen und anschließend mit den Cursor-Tasten "◀" und "▶" auf der Fernbedienung die Farbsättigung einstellen.

Zeile 6: PP Brightness; zeigt den Wert für die persönliche Helligkeitsvoreinstellung an, die der Benutzer vorgenommen hat (PP-Taste).
Der Wert kann variieren von 0 (minimale Helligkeit) bis 63 (größte Helligkeit). Die persönliche Helligkeitsvoreinstellung kann mit dem Menü "Sonderfunktionen" geändert und gespeichert werden.
Die Helligkeitseinstellung kann jederzeit geändert werden. Hierzu zunächst die rote Taste auf der Fernbedienung für das Bild-Menü drücken, dann "Helligkeit" wählen und anschließend mit den Cursor-Tasten "◀" und "▶" auf der Fernbedienung die Helligkeit einstellen.

Zeile 7: PP Contrast; zeigt den Wert für die persönliche Kontrastvoreinstellung an, die der Benutzer vorgenommen hat (PP-Taste).
Der Wert kann variieren von 0 (minimaler Kontrast) bis 63 (größter Kontrast). Die persönliche Kontrastvoreinstellungen kann mit dem Menü "Sonderfunktionen" geändert und gespeichert werden.
Die Kontrasteinstellung kann jederzeit geändert werden. Hierzu zunächst die rote Taste auf der Fernbedienung für das Bild-Menü drücken, dann "Kontrast" wählen und anschließend mit den Cursor-Tasten "◀" und "▶" auf der Fernbedienung den Kontrast einstellen.

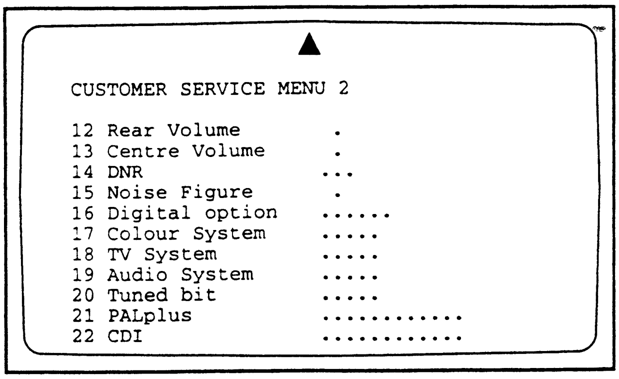
Zeile 8: PP Headphone; zeigt den Wert für die persönliche Kopfhörer-Lautstärkevoreinstellung an, die der Benutzer vorgenommen hat (PP-Taste). Der Wert kann variieren von 0 (minimale Lautstärke) bis 63 (maximale Lautstärke). Die persönliche Voreinstellung kann mit dem Menü "Sonderfunktionen" geändert und gespeichert werden.
Die Kopfhörer-Lautstärke kann jederzeit geändert werden. Hierzu zunächst die grüne Taste auf der Fernbedienung für das Ton-Menü drücken, dann "Kopfhörer" wählen, "Lautstärke" wählen und mit den Cursor-Tasten "◄" und "►" auf der Fernbedienung die Lautstärke ändern.

Zeile 9: Sharpness; zeigt die Schärfeeinstellung an. Der Wert kann variieren von 0 (minimale Schärfe) bis 4 (größte Schärfe). Wenn die von der Antenne empfangenen Signale schlecht sind, kann ein zu hoch eingestellter Schärfewert zu einem verrauschten Bild führen.
Die Schärfeeinstellung kann jederzeit geändert werden. Hierzu zunächst die rote Taste auf der Fernbedienung für das Bild-Menü drücken und "Schärfe" wählen, anschließend mit den Cursor-Tasten "◄" und "►" auf der Fernbedienung die Schärfe einstellen.

Zeile 10: Dolby; zeigt an, ob der empfangene Sender einen Ton mit "Dolby"-Kodierung aussendet (Vorhanden) oder nicht (Nicht vorhanden). Achtung: Eine eventuelle "Dolby"-Kodierung kann nur durch ein Dolby-Signal-Bit erkannt werden. Diese Dolby-Signalisierung wird bisher in Deutschland nicht ausgestrahlt. Es kann also durchaus sein, daß ein "Dolby"- kodierter Ton ausgestrahlt und im Gerät dekodiert wird, obwohl die Zeile 9 im CSM "Nicht vorhanden" zeigt.

Zeile 11: Surround Mode; zeigt den vom Benutzer gewählten Raumklang-Modus an. Dieser kann "Pro Logic", "Dolby 3 Stereo", "Hall" oder "Aus" sein. Der Raumklang-Modus kann jederzeit geändert werden. Hierzu wird zunächst die grüne Taste auf der Fernbedienung für das Ton-Menü gedrückt und "Dolby Pro Logic" gewählt und anschließend mit den Cursor-Tasten "◄" und "" auf der Fernbedienung der Raumklang-Modus eingestellt. Mit der weißen Taste der Fernbedienung kann der Raumklang-Modus direkt geändert werden.

Durch Drücken der Taste "▼" auf der Fernbedienung erscheint das Kundendienst-Menü 2.
Durch Drücken der Taste "▲" auf der Fernbedienung kehren Sie zum Kundendienst-Menü 1 zurück.



```
                    ▲
CUSTOMER SERVICE MENU 2

12 Rear Volume        .
13 Centre Volume      .
14 DNR               ...
15 Noise Figure       .
16 Digital option    ......
17 Colour System     .....
18 TV System         .....
19 Audio System      .....
20 Tuned bit         .....
21 PALplus           ............
22 CDI               ............
```

76532013_009.AI
080897

Das Kundendienst-Menü 2 zeigt folgendes:

Zeile 12: Rear Volume; zeigt den Lautstärkewert für die Surround-Lautsprecher an. Der Wert kann variieren von 0 (kleinste Lautstärke) bis 63 (größte Lautstärke). Die Lautstärke kann jederzeit geändert werden, und zwar wird zunächst die grüne Taste auf der Fernbedienung für das Ton-Menü gedrückt, "Dolby Pro Logic" und dann "Lautstärke hinten" gewählt und anschließend mit den Cursor-Tasten "◄" und "►" auf der Fernbedienung die Lautstärke eingestellt.
Diese Einstellmöglichkeit ist nur verfügbar, wenn der Surround-Modus auf "Dolby Pro Logic" oder "Hall" steht.

Zeile 13: Centre Volume; zeigt den Lautstärkewert für die "Center"-Lautsprecher an. Der Wert kann variieren von 0 (kleinste Lautstärke) bis 63 (größte Lautstärke).
Die Lautstärke kann jederzeit geändert werden, und zwar wird zunächst die grüne Taste auf der Fernbedienung für das Ton-Menü gedrückt, "Dolby Pro Logic" und dann "Lautstärke Zentrum" gewählt und anschließend mit den Cursor-Tasten "◄" und "►" auf der Fernbedienung die Lautstärke eingestellt.
Diese Einstellmöglichkeit ist nur verfügbar, wenn der Surround-Modus auf "Dolby Pro Logic" oder "Dolby 3 Stereo" steht.

Zeile 14: DNR (Dynamic Noise Reduction); zeigt die Einstellung der dynamischen Rauschreduzierung DNR für den gewählten Sender an (Bildrauschen). Die folgenden Einstellungen können gewählt werden:

- MD2.21E: "aus" oder "ein"
- MD2.22E: "aus", "min", "mittel" oder "max"
- MD2.22E: "aus" oder "automatisch" (MD2.22E mit "Automatischer Rauschreduzierung"
- MD2.23E; "aus" oder "automatisch"

Die Einstellung der DNR kann mit der DNR-Taste auf der Fernbedienung geändert werden.

Bild ist zu dunkel

1. Drücken Sie die Taste "Smart Picture, Smart Bild" auf der Fernbedienung. Wenn das Bild besser wird, nehmen Sie im Bildmenü Einstellungen für Helligkeit und Kontrast vor und speichern Sie diese neuen Einstellungen dann im Menü "Sonderfunktionen" mit dem Punkt "PP festlegen".
2. Nach dem Einschalten des Kundendienstmodus "CSM" ist das Bild in Ordnung: Erhöhen Sie die Einstellungen für Helligkeit und Kontrast. Wenn Sie eine gute Einstellung gefunden haben, speichern Sie diese Einstellung im Menü "Sonderfunktionen" mit dem Punkt "PP Festlegen".
3. Prüfen Sie Zeile 6 "PP Brightness" und 7 "PP Contrast" im Kundendienstmodus "CSM". Ist die Einstellung in Zeile 6 niedrig (<10) oder der Wert in Zeile 7 niedrig (<10), erhöhen Sie die Helligkeit und/oder erhöhen Sie den Kontrast. Wenn Sie eine gute Einstellung gefunden haben, speichern Sie diese Einstellung im Menü "Sonderfunktionen" mit dem Punkt "PP Festlegen".

Bild ist zu hell

1. Drücken Sie die Taste "Smart Picture, Smart Bild" auf der Fernbedienung. Wenn das Bild besser wird, verringern Sie die Helligkeit und/oder den Kontrast. Wenn Sie eine gute Einstellung gefunden haben, speichern Sie diese Einstellung im Menü "Sonderfunktionen" mit dem Punkt "PP Festlegen".
2. Nach dem Einschalten des Kundendienstmodus ist das Bild in Ordnung: Verringern Sie die Helligkeit und/oder den Kontrast. Wenn Sie eine gute Einstellung gefunden haben, speichern Sie diese Einstellung im Menü "Sonderfunktionen" mit dem Punkt "PP Festlegen".
3. Prüfen Sie Zeile 6 "PP Brightness" und 7 "PP Contrast". Ist die Einstellung in Zeile 6 hoch (>40) oder der Wert in Zeile 7 hoch (>50). Verringern Sie die Helligkeit und/oder erhöhen Sie den Kontrast. Speichern Sie diese neuen Einstellungen im Menü "Sonderfunktionen" mit dem Punkt "PP Festlegen".

Nachzieheffekte im Bild

Digitaler Effekt durch "Digital Scan", z.B. bei Sportsendungen mit schnellen Bewegungen. Nur bei MD2.22E- und MD2.23E-Geräten.
Prüfen Sie Zeile 14 "DNR".
Falls "DNR" auf "mittel" oder "max" eingestellt ist, stellen Sie "DNR" auf "min".

Weiße Linie um Bild- und Textteile

1. Drücken Sie die Taste "Smart Picture, Smart Bild" auf der Fernbedienung (S. Bedienungsanl.). Wenn das Bild bei einer der vorprogrammierten "Smart"-Einstellungen besser wird, verringern Sie die Schärfeeinstellung. Diese Einstellung wird automatisch gespeichert und ist individuell für jeden Programmplatz möglich.
2. Nach dem Einschalten des Kundendienstmodus ist das Bild in Ordnung.
   Veringern Sie die Schärfeeinstellung. Diese Einstellung wird automatisch gespeichert und ist individuell für jeden Programmplatz möglich.
3. Prüfen Sie Zeile 9 "Sharpness". Falls die Schärfe sehr hoch eingestellt ist, veringern Sie die Einstellung. Diese Einstellung wird automatisch gespeichert und ist individuell für jeden Programmplatz möglich.

Kein Bild

Prüfen Sie Zeile 20 "Tuned Bit".
Wenn die Anzeige "Ja" ist, installieren Sie das gewünschte Programm nochmals.
Zum Aufrufen des Installationsmenüs drücken Sie:
MD2.21E und MD2.22E; Drücken Sie gleichzeitig die Tasten "⍰" und "◷".
MD2.31E; Drücken Sie gleichzeitig die Tasten "⧓" und "▭", und führen Sie die Installation manuell aus.

Blaues Bild (Blue Mute)

Kein einwandfreier Empfang.
Prüfen Sie das Antennenkabel und/oder die Antennenanlage.

Blaues Bild und/oder unstabiles Bild

Wenn ein verschlüsseltes oder kodiertes Signal empfangen wird.

Schwarz/Weiß-Bild

Kontrollieren Sie Zeile 5 "PP Colour".
Wenn der Wert niedrig (<10) ist, erhöhen Sie den Farbwert.
Speichern Sie diese neue "Persönliche Einstellung".

Keine Farbe/farbige Linien rund um die Bildteile

1. Prüfen Sie die Zeilen 17 "Colour System" und 18 "TV System".
   Wenn in Zeile 17 "PAL" angegeben ist und in Zeile 18 "M 38,9" steht, ist für den eingeschalteten Programmplatz das Fernseh-System für "USA" installiert, während "West Europa" eingestellt sein muß. Installieren Sie das gewünschte Programm nochmals.
   Aufrufen des Installationsmenüs:
   MD2.21E und MD2.22E; Drücken Sie gleichzeitig die Tasten "⍰" und "◷".
   MD2.31E; Drücken Sie gleichzeitig die Tasten "⧓" und "▭", und führen Sie die Installation manuell aus.
   Wählen Sie dabei "TV-System: Westeuropa".
2. Wenn Zeile 17 "PAL" ist und Zeile 18 ist "L", ist das installierte TV-System für diesen Programmplatz "Frankreich", während "West Europa" eingestellt sein muß. Installieren Sie das gewünschte Programm nochmals, und zwar manuell.
   Aufrufen des Installationsmenüs:
   MD2.21E und MD2.22E: Drücken Sie gleichzeitig die Tasten "⍰" und "◷".
   MD2.23E: Drücken Sie gleichzeitig die Tasten "⧓" und "▭".
   Wählen Sie dabei "TV-System: Westeuropa".

Keine Farbe/Unruhiges Bild

1. Prüfen Sie die Zeilen 17 "Colour System" und 18 "TV System".
   Wenn Zeile 17 "Schwarz/Weiß" ist und Zeile 18 ist "BG", ist das installierte TV-System für diesen Programmplatz "Westeuropa", während "USA" eingestellt sein muß. Installieren Sie das gewünschte Programm nochmals.
   Aufrufen des Installationsmenüs:
   MD2.21E und MD2.22E: Drücken Sie gleichzeitig die Tasten "⍰" und "◷".
   MD2.31E: Drücken Sie gleichzeitig die Tasten "⧓" und "▭", und führen Sie die Installation manuell aus.
   Wählen Sie dabei "TV-System: Amerika".
2. Wenn Zeile 17 "Schwarz/Weiß" ist und Zeile 18 ist "L", ist das installierte TV-System für den eingestellten Programmplatz "Frankreich", während "USA" eingestellt sein müßte. Installieren Sie das gewünschte Programm nochmals.

Aufrufen des Installationsmenüs:
MD2.21E und MD2.22E: Drücken Sie gleichzeitig die Tasten "⍰" und "◷".
MD2.31E: Drücken Sie gleichzeitig die Tasten "⧓" und "PP", und führen Sie die Installation manuell aus.
Wählen Sie dabei "TV-System: Amerika".

Farben nicht einwandfrei

Prüfen Sie die Zeilen 17 "Colour System" und 18 "TV System". Wenn Zeile 17 "PAL" ist und Zeile 18 ist "L", ist das installierte TV-System für den eingestellten Programmplatz "Frankreich", während "Westeuropa" eingestellt sein müßte. Installieren Sie das gewünschte Programm nochmals.
Zum Aufrufen des Installationsmenüs drücken Sie:
Aufrufen des Installationsmenüs:
MD2.21E und MD2.22E: Drücken Sie gleichzeitig die Tasten "⍰" und "◷".
MD2.31E: Drücken Sie gleichzeitig die Tasten "⧓" und "PP", und führen Sie die Installation manuell aus.
Wählen Sie dabei "TV-System: Westeuropa".

Farben nicht einwandfrei/unstabiles Bild

Prüfen Sie die Zeilen 17 "Colour System" und 18 "TV System". Wenn Zeile 17 "SECAM" ist und Zeile 18 ist "BG", ist das installierte System für den eingestellten Programmplatz "USA", während "Frankreich" eingestellt sein müßte. Installieren Sie das gewünschte Programm nochmals.
Zum Aufrufen des Installationsmenüs drücken Sie:
Aufrufen des Installationsmenüs:
MD2.21E und MD2.22E: Drücken Sie gleichzeitig die Tasten "⍰" und "◷".
MD2.31E: Drücken Sie gleichzeitig die Tasten "⧓" und "PP", und führen Sie die Installation manuell aus.
Wählen Sie dabei "TV-System: Frankreich".

Unstabiles Bild

Prüfen Sie die Zeilen 17 "Colour System" und 18 "TV System". Wenn Zeile 17 "SECAM" ist und Zeile 18 ist "M 38,9", ist das installierte System für den eingestellten Programmplatz "Westeuropa", während "Frankreich" eingestellt sein müßte. Installieren Sie das gewünschte Programm nochmals.
Zum Aufrufen des Installationsmenüs drücken Sie:
Aufrufen des Installationsmenüs:
MD2.21E und MD2.22E: Drücken Sie gleichzeitig die Tasten "⍰" und "◷".
MD2.31E: Drücken Sie gleichzeitig die Tasten "⧓" und "PP", und führen Sie die Installation manuell aus.
Wählen Sie dabei "TV-System: Frankreich".

Menütext ist nicht scharf genug

1. Drücken Sie die Taste "Smart Picture, Smart Bild" auf der Fernbedienung. Wenn das Bild besser wird, verringern Sie den Kontrast. Speichern Sie die neue Einstellung im Menü "Sonderfunktionen" mit dem Punkt "PP Festlegen".

2. Nach dem Einschalten des Kundendienstmodus ist das Bild in Ordnung. Verringern Sie den Kontrast. Speichern Sie die neue Einstellung im Menü "Sonderfunktionen" mit dem Punkt "PP Festlegen".

3. Prüfen Sie Zeile 7 "PP Contrast".
   Ist der Wert in Zeile 7 hoch (>50):
   Verringern Sie den Kontrast. Speichern Sie die neue Einstellung im Menü "Sonderfunktionen" mit dem Punkt "PP Festlegen".

Schwierigkeiten mit dem Ton

Kein Ton aus den externen Lautsprechern

Prüfen Sie den Schalter für die externen Lautsprecher an der Geräterückseite. Der Schalter muß in der Stellung "Externe Lautsprecher" stehen.

Kein Ton aus dem linken und rechten Lautsprecher

1. Prüfen den Schalter für die externen Lautsprecher an der Geräterückseite. Wenn dieser Schalter in der Stellung "Externe Lautsprecher" steht, wird das Tonsignal nur zu den Surround-Lautsprechern geleitet.
   Sind die externen Lautsprecher angeschlossen? Wenn nicht: Schließen die die externen Lautsprecher an oder schalten Sie den Schalter für die externen Lautsprecher zurück in die Stellung "Keine externen Lautsprecher".

2. Drücken Sie die Taste "Smart Sound, Smart Ton" auf der Fernbedienung. Wenn der Ton besser wird, erhöhen Sie die Lautstärke. Speichern Sie die neue Einstellung im Menü "Sonderfunktionen" mit dem Punkt "PP Festlegen".

3. Nach dem Einschalten des Kundendienstmodus ist die Lautstärke in Ordnung. Erhöhen Sie die Lautstärke. Speichern Sie die neue Einstellung im Menü "Sonderfunktionen" mit dem Punkt "PP Festlegen".

4. Prüfen Sie die Zeile 4 "PP Volume".
   Ist der Wert niedrig, so erhöhen Sie die Lautstärke. Speichern Sie die neue Einstellung im Menü "Sonderfunktionen" mit dem Punkt "PP Festlegen".

Ton zu laut im linken und rechten Lautsprecher

1. Drücken Sie die Taste "Smart Sound, Smart Ton" auf der Fernbedienung. Wenn der Ton besser wird, reduzieren Sie die Lautstärke. Speichern Sie die neue Einstellung im Menü "Sonderfunktionen" mit dem Punkt "PP Festlegen".

2. Nach dem Einschalten des Kundendienstmodus ist die Lautstärke in Ordnung. Reduzieren Sie die Lautstärke. Speichern Sie die neue Einstellung im Menü "Sonderfunktionen" mit dem Punkt "PP Festlegen".

3. Prüfen Sie die Zeile 4 "PP Volume".
   Ist der Wert zu hoch, verringern Sie die Lautstärkeinstellung. Speichern Sie die neue Einstellung im Menü "Sonderfunktionen" mit dem Punkt "PP Festlegen".

Kein Ton aus den Surround-Lautsprechern

1. Prüfen Sie Zeile 12 "Rear Volume".
   Ist der Wert niedrig, erhöhen Sie die "Lautstärke hinten" im Tonmenü unter dem Punkt "Dolby Prologic".

2. Prüfen Sie Zeile 11 "Surround Mode".
   Der "Raumkland-Modus" steht auf "Dolby 3 Stereo" oder "Off": Wählen Sie "Pro Logic" oder "Hall".

Ton zu laut aus den "Surround-Lautsprechern"

Prüfen Sie Zeile 12 "Rear Volume".
Ist der Wert hoch, so veringern Sie die " Lautstärke hinten" im Menü "Dolby Prologic".

Kein Ton aus den "Center-Lautsprechern"

Prüfen Sie Zeile 13 "Centre Volume".
Ist der Wert niedrig, so erhöhen Sie die "Lautstärke Zentrum" im Menü "Dolby Prologic".

Ton zu laut aus den "Center-Lautsprechern"

Prüfen Sie Zeile 13 "Centre Volume".
Ist der Wert hoch, so verringern Sie die "Lautstärke Zentrum" im Menü "Dolby Prologic".

Zeile 15: Noise Figure; zeigt einen vom CTV-Gerät ermittelten Wert für das Signal/Rausch-Verhältnis des gewählten Sender an. Dieser Wert kann variieren von 0-2 (guter Empfang) über 4-5 (durchschnittlicher Empfang) bis 7 oder höher (schlechter Empfang).
Dies funktioniert nur, wenn die "Automatische Rauschreduzierung" DNR auf "aus/automatisch" steht.

Zeile 16: Digital Option; zeigt den gewählten Bildverarbeitungsmodus an: "100Hz", Digital Scan" oder "Natural Motion" (Auswahlmöglichkeiten abhängig von Geräteausstattung).
Die digitale Option kann geändert werden:
Hierzu drücken Sie auf der Fernbedienung die rote Taste für das Bild-Menü und wählen "Digital Scan" bzw. "Digital Option". Mit den Cursor-Tasten "◀" und "▶" kann die Einstellung geändert werden.

Zeile 17: Colour System; Angabe über das Farbsystem des gewählten Senders:

Schwarz / Weiß	kein Farbträger empfangen
PAL:	PAL-Signal empfangen
SECAM:	SECAM-Signal empfangen
NTSC:	NTSC-Signal empfangen

Zeile 18: TV System; Angabe über das Fernsehsystem des gewählten Senders:

BG:	BG-Signal empfangen
DK:	DK-Signal empfangen
I:	PAL I-Signal empfangen
L:	SECAM L-Signal empfangen
M38.9:	NTSC M-Signal mit Bildträger auf 38,9 MHz empfangen
MN:	NTSC M-Signal empfangen

Zeile 19: Audio System; Angabe über das Tonsysten des gewählten Senders:

Ton abgeschaltet	Kein Ton
Dolby Pro Logic:	Dolby-Pro-Logic-Ton empfangen
Mono:	Mono-Ton empfangen
Stereo:	Stereo-Ton empfangen
Dual I:	Zweikanalton empfangen, Sprache I eingeschaltet
Dual II;	Zweikanalton empfangen, Sprache II eingeschaltet
Digital Mono:	Digitaler Mono-Ton wird empfangen
Digital Stereo	Digitaler Stereo-Ton wird empfangen
Digital Dual I:	Digitale Sprache I wird empfangen
Digital Dual II:	Digitale Sprache II wird empfangen

Zeile 20: Tuned Bit; Angabe über den Abstimmvorgang des auf dem gewählten Programmplatz gespeicherten Voreinstellung. Wenn die Angabe "Ja" lautet, ist die Voreinstellung durch die manuelle Eingabe der Frequenz gespeichert worden, während kein Sender auf dieser Frequenz empfangen wurde. In diesem Fall versucht das Gerät immer, wenn dieser Programmplatz gewählt wird, einen "Micro-Search" auszuführen. Fällt der Vorgang einmal erfolgreich aus, d.h. wird ein Sender gefunden, wird das "Tuned Bit" auf "Nein" geschaltet.

Zeile 21: PALplus; zeigt die Konfigurationseinstellung für "VCR" an. Diese kann "PALplus" oder "Nicht PALplus" lauten. Wenn "PALplus" gewählt wird, werden die Luminanz- und die Chrominanz-Signale des VCR-Signals auf der PALplus-Platine dekodiert. Sie können diese Einstellung mit den Cursortasten "◀" und "▶" ändern, nachdem Sie auf der Fernbedienung zunächst das Installationsmenü aufgerufen haben, dann "Grundeinstellung" und "VCR" gewählt haben.
Aufrufen des Installationsmenüs:
MD2.21E und MD2.22E: Drücken Sie gleichzeitig die Tasten "⍰" und "◷".
MD2.23E: Drücken Sie gleichzeitig die Tasten "⧓" und "PP".

Zeile 22: CDI; zeigt die Konfigurationseinstellung für CDI / Foto CD an. Diese kann "Vorhanden" oder "Nicht vorhanden" sein. Wird "Vorhanden" gewählt, ist die Ausgangslage ein "Top-Quality-Signal', so daß einige Einstellungen in der Signalverarbeitung automatisch geändert werden.
Sie können die Einstellung mit den Cursortasten "◀" und "▶" ändern, nachdem Sie auf der Fernbedienung zunächst das Installationsmenü aufgerufen und dann "Grundeinstellung" und "CD-I/Photo CD" gewählt haben.
Aufrufen des Installationsmenüs:
MD2.21E und MD2.22E: Drücken Sie gleichzeitig die Tasten "⍰" und "◷".
MD2.23E: Drücken Sie gleichzeitig die Tasten "⧓" und "PP".

Lösungshinweise zu möglichen Problemen

Hinweise zur Änderung von Einstellungen sind im Abschnitt "Genaue Beschreibung des Kundendienstmodus" beschrieben.

Bild-Probleme

Streifen im Bild bei PALplus-VCR-Wiedergabe
Prüfen Sie Zeile 21 "PALplus".
Wenn in Zeile 21 "kein PALplus" angezeigt wird, ändern Sie die Konfiguration in "PALplus". Dazu im Menü "Grundeinstellung" den Punkt "VCR-Typ" aufrufen.

Schlechte Bildqualität bei CDI- / Foto-CD-Bildern
Prüfen Sie Zeile 22 "CDI".
Wenn in Zeile 22 "Nicht vorhanden" angezeigt wird, ändern Sie die Einstellung in "Vorhanden". Dazu im Menü "Grundeinstellung" den Punkt " CD-I/Photo-CD" aufrufen.

Verschneites und/oder unruhiges Bild
1. Prüfen Sie Zeile 15 "Noise Figure".
   Wenn der Wert größer als 7 ist und wenn er auch in anderen Programmen höher ist, prüfen Sie das Antennenkabel und/oder die Antennenanlage.

2. Prüfen Sie die Zeilen 9 "Schärfe", 14 "DNR" und 15 "Noise Figure".
   Wenn der Wert in Zeile 9 3 oder 4 beträgt und der Wert in Zeile 15 7 oder höher ist, veringern Sie den Wert in Zeile 9 "Schärfe" und schalten Sie DNR (Zeile 14) ein oder auf einen höheren Wert. Dies ist abhängig von der Gerätetype (siehe Bedienungsanleitung).

Farbfernsehen **Chassis**

Service
Service
Service

MD2.21 E
2.22 E
2.23 E
AA 97.01

Service Information

Customer Service Mode (CSM)

Sämtliche MD2.21/2.22/2.23E-Geräte sind mit dem sogenannten "Customer Service Mode" (CSM) ausgerüstet. Der "Kundendienst-Modus" (CSM) ist ein spezieller Servicemodus, der vom Kunden selbst ein- und ausgeschaltet werden kann. Hierzu kann er vom Kundendiensttechniker bzw. Vertragshändler telephonisch aufgefordert werden, um den Zustand und die Einstellungen des Geräts zu überprüfen. Der CSM ist ein Nur-Lese-Modus, so daß Änderungen von Einstellungen in diesem Modus nicht möglich sind.

Einschalten des Kundendienst-Modus

Der Kundendienst-Modus wird eingeschaltet, indem man mindestens 4 Sekunden lang gleichzeitig die 🔇 Taste ("MUTE"=Stummschaltung) auf der Fernbedienung und die "MENU"-Taste am Fernsehgerät gedrückt hält.

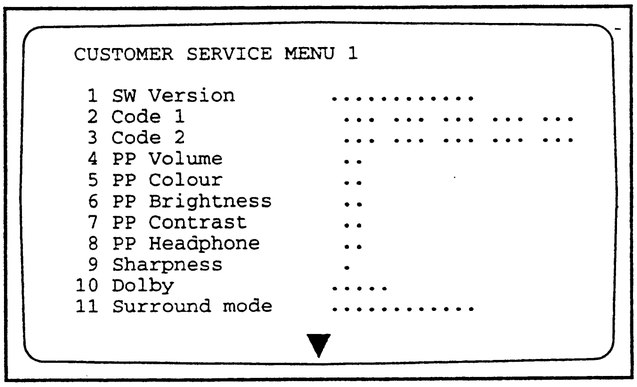
Ausschalten des Kundendienst-Modus

Der Kundendienst-Modus wird ausgeschaltet durch drücken irgendeiner Taste (außer den Cursor-Tasten "▼" und "▲") auf der Fernbedienung oder am Fernsehgerät, oder wenn Sie das Gerät mit dem Netzschalter ausschalten.

Genaue Beschreibung des Kundendienst-Modus

Der Kundendienstmodus besteht aus zwei (Bildschirm-) Seiten.

Nach dem Einschalten des Kundendienst-Modus erscheint auf dem Bildschirm folgendes:



```
CUSTOMER SERVICE MENU 1

 1 SW Version         ............
 2 Code 1              ... ... ... ... ...
 3 Code 2              ... ... ... ... ...
 4 PP Volume           ..
 5 PP Colour           ..
 6 PP Brightness       ..
 7 PP Contrast         ..
 8 PP Headphone        ..
 9 Sharpness           .
10 Dolby              .....
11 Surround mode      ............
                         ▼
```

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Die Kundendienst-Menüseite 1 zeigt die folgenden Informationen, welche die aktuellen Geräteeinstellungen wiedergeben:

Zeile 1: SW Version; Die eingebaute Software-Version Einzelheiten über die Software-Version finden Sie im Kapitel "Software-Übersicht" der Broschüre "Produktübersicht - Farbfernsehgeräte" (Product-Survey).

Zeile 2: Code 1; zeigt die 5 zuletzt aufgetretenen Fehler als Fehlercode an. Sowie die eingebaute Diagnose-Software einen Fehler festgestellt hat, wird der Fehlerspeicher aktualisiert.

Zeile 3: Code 2; zeigt die 5 zuerst aufgetretenen Fehler als Fehlercode an. Sowie die eingebaute Diagnose-Software einen Fehler festgestellt hat, wird der Fehlerspeicher aktualisiert.

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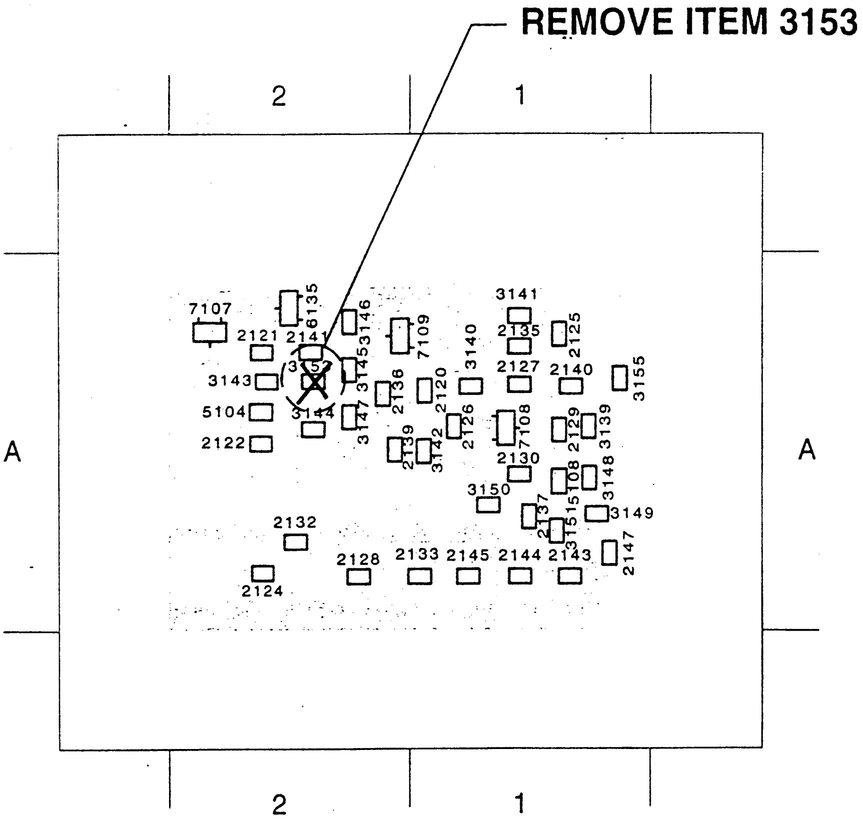
PHILIPS


REMOVE ITEM 3153
2
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A
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2121
2141
6135
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7109
3141
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3153
3145
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2124

2120	A 1	2144	A 1	5108	A 1
2121	A 2	2145	A 1	6135	A 2
2122	A 2	2147	A 1	7107	A 2
2124	A 2	3139	A 1	7108	A 1
2125	A 1	3140	A 1	7109	A 2
2126	A 1	3141	A 1		
2127	A 1	3142	A 1		
2128	A 2	3143	A 2		
2129	A 1	3144	A 2		
2130	A 1	3145	A 2		
2132	A 2	3146	A 2		
2133	A 1	3147	A 2		
2135	A 1	3148	A 1		
2136	A 2	3149	A 1		
2137	A 1	3150	A 1		
2139	A 2	3151	A 1		
2140	A 1	3153	A 2		
2141	A 2	3155	A 1		
2143	A 1	5104	A 2		

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Option Codes

Optionskode 1

0	Multi-Westeurope; IF-Modul mit L5101 und ohne Drahtbrücke 4111
1	Multi-Frankreich; IF-Modul mit L5102
2	Multi-Osteurope; IF-Modul mit L5101 und Drahtbrücke 4111
128	3. Eurostecker vorhanden
256	Europäisches PIP-Modul
512	Südamerikanisches PIP-Modul
768	Japanisches PIP-Modul
1024	Europäischer PIP-Tuner
2048	Südamerikanischer PIP-Tuner
3072	Japanischer PIP-Tuner
4096	PIP-Modul vorhanden

Farbfernsehen

Chassis

MD2.21E
MD2.22E

AA 98.01

Service
Service
Service

Einführung der automatischen Rauschunterdrückung

Im Zuge der Produktion ist in allen -/12-MD2.2x-Geräten eine automatische Rauschunterdrückung (Automatic Noise Reduction, ANR) eingeführt worden. Gleichzeitig wurde die Multi-PIP-Funktion herausgenommen, weil beide Funktionen nicht gleichzeitig verfügbar sein können.

Die ANR haben alle MD2.21E-Geräte erhalten, ebenso die MD2.22E-Geräte, deren Seriennummern mit AG01 und höher beginnen.

Aufgrund der Einführung der automatischen Rauschunterdrückung ist die folgende Feature Box der Teileliste der Wartungsanleitung MD2.21E/MD2.22E/MD2.23E AA hinzuzufügen:

Feature box 3 L	4822 212 11417
Feature box 3 S/L	4822 212 11198
Feature box 3 S/L/P	4822 212 11425
Feature box 4 L	4822 212 11377
Feature box 4 S/L/P	4822 212 11204
Feature box 4 S/L/P VGA	4822 212 11323
Feature box 4 S/L/P PALplus	4822 212 11207
Feature box 4 S/L/P PALplus VGA	4822 212 11324

Geräusche aus den drahtlosen Surround-Boxen

Störende Geräusche aus den drahtlosen Surround-Boxen, die entstehen, wenn sich zwischen dem Fernsehgerät und den drahtlosen Surround-Boxen ein Gegenstand befindet oder bewegt, können durch eine höhere Leistung des Drahtlossenders vermieden werden. Hierzu wird der Widerstand R3153 (1k5) des Moduls 1403 auf der Senderplatine (AE1) entfernt. Die Komponenten auf dieser Platine sind nicht bezeichnet. Der einzige 1k5-Widerstand ist der zweite links oben, wenn die Platine so gehalten wird, daß die Anschlußstifte nach unten gerichtet sind, (siehe Abbildung).

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Published by LM 9862 TV Service Department Printed in The Netherlands Subject to modification (D) 4822 727 21596

PHILIPS

Optionskode 2

0	100Hz
1	Digitale Adtastung
2	Smartic IC7008 auf AI-Modul vorhanden
4	Panic IC7010 auf AI-Modul vorhanden
8	Limeric IC7006 auf AI-Modul vorhanden
16	Feature box 4 vorhanden
64	Feature box vorhanden
256	16:9 Bildröhre
512	Kammfilter vorhanden
4096	TDA9143 vorhanden
8192	Rasterdrehschaltung IC7050 vorhanden
16384	Untertitel-Squeeze mit Feature box 3 vorhanden

Optionskode 3

1	NICAM vorhanden
2	Äußerster Ton vorhanden
4	Entzerrer vorhanden
8	Dolby vorhanden
16	Automatische Umschaltung zu vom Sender gesteuertem Dolby vorhanden
128	Teletext mit Niveau 2.5 eingeschaltet
256	IC7490 ist ein Teletext-Speicher mit 512kB, (400 Seiten)
512	IC7490 ist ein Teletext-Speicher mit 1MB, (800 Seiten)
1024	Teletext vorhanden
2048	Breitbild-Signalierungsbit für automatische 16/9-Wahl ist eingeschaltet
4096	PALplus vorhanden
8192	Projekt 50 (Easylink) vorhanden

Optionskode 4

	Nicht in Gebrauch

Optionskode 5

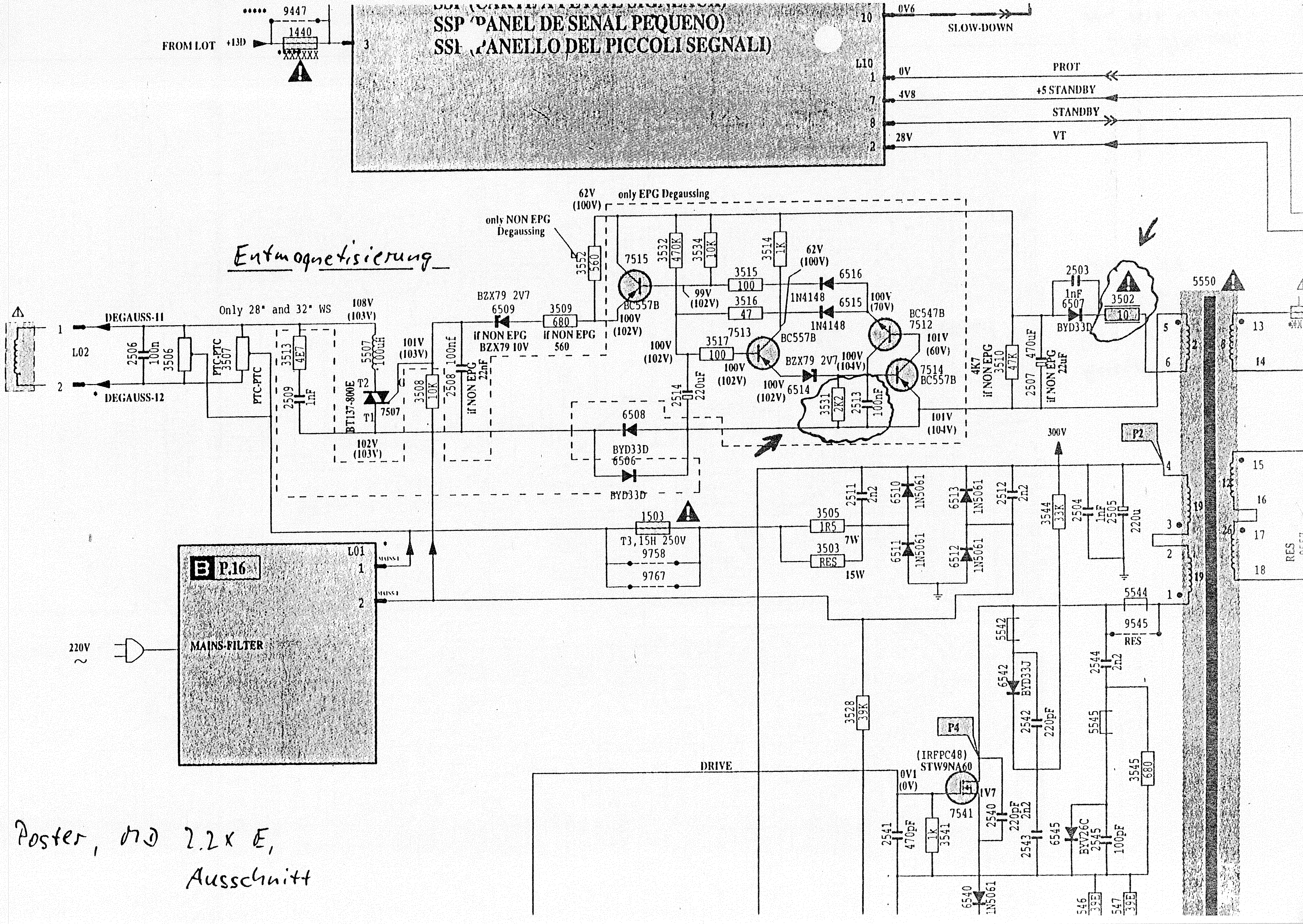
1	Schärfe im Bildmenü
2	Tint im Bildmenü
4	Nach den einschalten des Geräts mit dem Netzschalter (Einschaltmodus) erscheint das Sprachwahlmenü
8	Demo-Modus eingeschaltet
256	CTI eingeschaltet
512	Vorliebeprogrammwahl eingeschaltet
1024	Stand-by-Umschaltung eingeschaltet; mit dem Stand-by-Schalter am Gerät kann zwischen Stand-by und Normalbetrieb umgeschaltet werden
2048	Blausignalunterdrückung eingeschaltet, wenn kein Bild gefunden wird
4096	Multi-PIP eingeschaltet

Optionskode 6

1	Auto-Speichermodus über ATS (PDC/VPS) eingeschaltet
2	Auto-Speichermodus über ACI eingeschaltet
4	Ständige Untertitelung eingeschaltet
8	Vorzug von FLOF-Teletext
16	TXT-Zeichen für Westeurope
32	PDC-Infozeile eingeschaltet

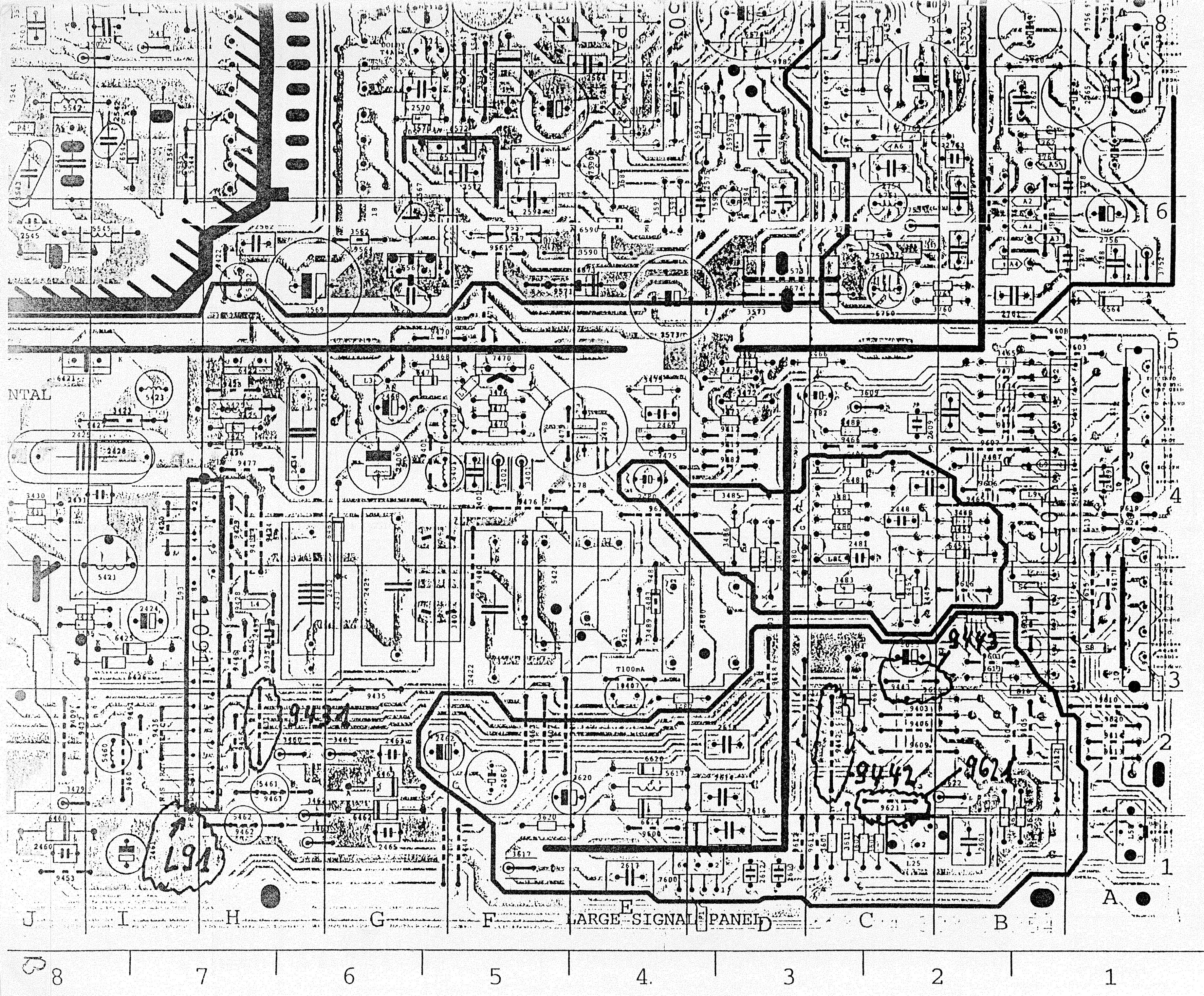
Optionskode 7

1	Elektrischer Programmführer eingeschaltet, (IC7204 auf TXT- und Steuerungsmodul vorhanden)
2	TXT/EPG/DualScreen eingeschaltet, (IC7461, IC7462 und IC7463 auf dem TXT- und Steuerungsmodul vorhanden)
4	Autoformatierung FBX; nur in 16/9-Geräten, wenn Panic (IC7010) und Smartic (IC7008) auf dem AI-Modul vorhanden sind
8	Automatische Erkennung des Bildseitenverhältnisses, (Erkennung des schwarzen Balkens) eingeschaltet
16	Luminanz-Übertragungsverbesserung IC7508 (TDA9177) vorhanden
32	Telefon-Schnittstelle vorhanden
64	VGA-Modul vorhanden
128	Modul für schnurlose Dolbyeinstellung vorhanden
512	Modul für Video DualScreen vorhanden
768	Automatische Scharfeinstellung eingeschaltet
1024	Kühlkörper auf Bildröhren-Scavem-Platine vorhanden
2048	Auto-Smart-Steuerung eingeschaltet


SSP (PANEL DE SENAL PEQUENO)
SSI (PANELLO DEL PICCOLI SEGNALI)
FROM LOT
+13D
9447
1440
XXXXXX
3
10
0V6
SLOW-DOWN
L10
1
0V
PROT
7
4V8
+5 STANDBY
8
STANDBY
2
28V
VT
62V
(100V)
only EPG Degaussing
only NON EPG
Degaussing
3552
560
7515
BC557B
3532
470K
3534
10K
3514
1K
62V
(100V)
3515
100
6516
99V
(102V)
3516
47
1N4148
6515
1N4148
100V
(70V)
BC547B
7512
101V
(60V)
7513
BC557B
3517
100
100V
(102V)
BZX79 2V7
6514
100V
(104V)
7514
BC557B
3531
2K2
2513
100nF
101V
(104V)
2514
220uF
6508
BYD33D
6506
BYD33D
4K7
if NON EPG
3510
47K
2507
470uF
if NON EPG
22uF
2503
1nF
6507
BYD33D
3502
10
5550
5
6
13
14
15
16
17
18
RES
L02
DEGAUSS-11
DEGAUSS-12
2506
100n
3506
PTC-PTC
3507
Only 28" and 32" WS
108V
(103V)
3513
4E7
2509
1nF
5507
100uH
BT137-800E
T2
T1
G
7507
102V
(103V)
101V
(103V)
3508
10K
2508
100nf
if NON EPG
22nF
BZX79 2V7
6509
if NON EPG
BZX79 10V
3509
680
if NON EPG
560
1503
T3,15H 250V
9758
9767
B P.16
L01
MAINS-FILTER
MAINS1
220V
~
3505
1R5
7W
3503
RES
15W
2511
2n2
6510
1N5061
6511
1N5061
6513
1N5061
6512
1N5061
2512
2n2
300V
3544
33K
2504
1nF
2505
220u
P2
4
3
2
1
19
12
26
5544
9545
RES
5542
6542
BYD33J
2542
220pF
2544
2n2
5545
3545
680
3528
39K
DRIVE
P4
(IRFPC48)
STW9NA60
0V1
(0V)
1V7
7541
2541
470pF
1k
3541
2540
220pF
2n2
2543
6545
BYV26C
2545
100pF
6540
1N5061
546
39E
547
39E

Entmagnetisierung

Poster, MD 2,2x E,
Ausschnitt


LARGE SIGNAL PANEL
PANEL
NTAL
1091
T100mA
9443
9442
9621
9434
L91
A
B
C
D
E
F
G
H
I
J
1
2
3
4
5
6
7
8

Ausschnitt aus
Service Manual
MD 2.2 x E,
Seite 14

Serv. Manual:

90

Philips Consumer Service GmbH
Colonia-Allee 11, 51067 Köln
Tel.: 0221/96960-0, Fax: 0221/96960-809

PHILIPS

Art. Code: 05
Sachgebiet: CTV
Memo: DE10DAR

SI

Wichtig für die Werkstatt!
Nummer: 4822 830 05008
Datum: 10.09.1997

Service Information

Betrifft: MD 2.2X, nexTView

Verteiler: S1,F1

Innerhalb der Videotext-Daten wird von einigen Sendern ein neuer Dienst angeboten. Dieser Dienst nennt sich allgemein EPG (Electronic Program Guide) und beinhaltet Programmdaten von verschiedenen Sendern für die nächsten 7 Tage.

Der Markenname für EPG in Philips-CTV-Geräten lautet „nexTView“.

Im Verlauf der gesamten Testausstrahlungen konnte zeitweilig folgendes Fehlverhalten bei CTV-Geräten mit Chassis MD 2.2X und nexTView festgestellt werden:

- Der Speicherinhalt für einzelne Programm-Vorschauseiten wird selbsttätig gelöscht, in diesem Fall erscheint die Mitteilung „ nexTView muß aktualisiert werden“.
- Das CTV-Gerät schaltet in seltenen Fällen in „stand by“-Betrieb.

Abhilfe bringt der Einbau einer neuen Betriebssoftware. Die Software befindet sich auf dem Text/Control-Modul und ist gesockelt, es muß also nicht gelötet werden.
Die Positionnummer lautet: 7202.
Alle Software-Stände unter oder gleich ..820 (dies sind die letzten 3 Ziffern der aufgedruckten 12-stelligen Nummer) müssen erneuert werden. Der Software-Stand kann auch im Service- oder im Customer-Service-Menü auf dem Bildschirm abgelesen werden.
Die Bestellnummer lautet: 4822 900 11058. Die neue Software ist ab KW 9739 verfügbar.

Auf der zweiten Seite dieser SI finden Sie eine Liste der infrage kommenden Geräte und eine Zeichnung des mechanischen Aufbaus vom Chassis MD 2.2 und der Lage des Text/Control-Panels.

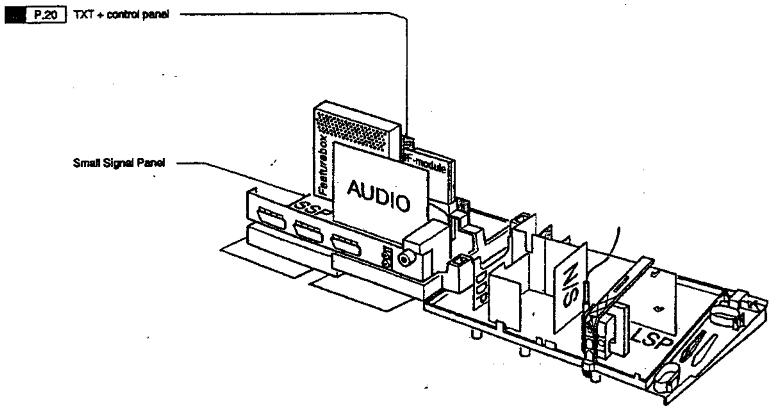
Des weiteren finden Sie im Anhang eine Werbeinformation über nexTView.

Im Garantiefall bitte über RKV mit IRIS-Code: 2 17X CTR 1 A abrechnen.

.../2

Nachdruck nicht gestattet! Änderungen vorbehalten.

Chassis-Überblick



Geräte mit nexTView:

- 32 PW 9763
- 28 PW 9763
- 32 PW 9713
- 28 PW 9513
- 24 PW 9553
- 29 PT 9113
- 29 PT 8703
- 25 PT 8703

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Art. Code: 05
Sachgebiet: CTV
Memo: DE10DAR

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Wichtig für die Werkstatt!

Nummer: 4822 830 05010

Datum: 19. November 1997

Service Information

Betrifft: MD 2.2X E, N/S-Platine

Verteiler: S1,F1

Bei Geräten mit Chassis MD 2.2X E und 29"-Bildröhren kann ein leichter sogenannter „Seagull"-Effekt auftreten. Die horizontalen Linien eines Gittertestbildes hängen dann oben im Bild leicht durch, entsprechend wölben sie sich unten leicht nach oben.

Dieses Ablenkverhalten kann verbessert werden durch nachrüsten der Nord-Süd-Platine.

Diese Platine mit der Bestell - Nummer **4822 212 11564** wird auf Position **L 91** auf der Großsignal - Platine (LSP) eingelötet.

Außerdem muß die Drahtbrücke **9621** entfernt werden, und die Drahtbrücken **9431, 9442 und 9443** müssen eingebaut werden. Diese Bauteile befinden sich ebenfalls auf der Großsignal - Platine.

Zur besseren Orientierung finden Sie einen Ausschnitt des Platinen - Layout anbei.

Anmerkung:

Die N/S-Platine 4822 212 11564 wird voraussichtlich ab Kal.-Woche 51 lieferbar sein.

A

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Art. Code: 05
Sachgebiet: CTV
Memo: DE10DAR

SI

Wichtig für die Werkstatt!

Nummer: 4822 830 05011

Datum: 08.01.1998

Service Information

Betrifft: MD 2.2X E, Software

Verteiler: S1,F1

Für die CTV-Geräte mit Chassis **MD 2.2X E** gibt es z.Zt. zwei verschiedene Software-Varianten.

Die Bestellnummern lauten:

4822 900 11102	für Geräte **ohne EPG** (nexTView)
4822 900 11058	für Geräte **mit EPG** (nexTView)

Diese Bestellnummern gelten für alle westeuropäischen Geräte, zu erkennen an der Strichausführung: /12 hinter der Typenbezeichnung des Gerätes.

Unter den Bestellnummern werden jeweils die neuesten Varianten der Software geliefert.

Unter anderem ist bei dieser Software das Verhalten der **OSD-Anzeige geändert** worden. Man kann zwischen 2 Anzeigearten wählen:

1. Längere Anzeige mit schwarzen Balken.
2. Kürzere Anzeige ohne schwarze Balken, nur mit dunklen Ziffern.

Zwischen den Modi umgeschaltet wird durch drücken der OSD-Taste länger als 5 sec.

Diese Software-Varianten sind seit KW 9743 ab Werk eingebaut.

Form 80 048

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[illegible]
909

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Art. Code: 05
Sachgebiet: CTV

Memo: DE10DAR

SI

Wichtig für die Werkstatt!

Nummer: 4822 830 05014

Datum: 18.02.1998

Service Information

Betrifft: MD 2, 16:9, Bildlage

Verteiler: S1,F1

Unter ungünstigen Umständen kann es bei Geräten mit Chassis MD 2.XX E und 28"-16:9-Bildröhren vorkommen, daß das Bild schief geschrieben wird, also nach einer Seite abfallend. Ursache ist ein Magnetfeld, welches auf die Ablenkung Einfluß nimmt, in der Regel das Erdmagnetfeld.

Bei Geräten mir 32"-Bildröhren ist eine sogenannte „Picture-Rotation"-Schaltung eingebaut, mit welcher über eine Spule an der Ablenkeinheit die Bildlage beeinflußt werden kann.

Diese Schaltung kann bei Bedarf in 28"-Geräten nachgerüstet werden.

Dazu muß die N/S-Korrekturplatine gegen die Version mit „Picture-Rotation"-Schaltung ausgetauscht werden, und die zusätzliche Spule muß an der Ablenkeinheit angebracht werden.

Danach muß noch die Option 2 um 8192 erhöht werden (oder in „Picture-Tube-Options" den Punkt „Picture-Rotation" auf „Yes" stellen). Danach läßt sich im Menü Grundeinstellung die Bildlage beeinflussen.

Die Bestellnummern lauten:

- ■ N/S-Platine mit Pict. Rot.: 4822 212 11287
- ■ Spule: 4822 157 70615

IRIS-code: 1338 DFL Y I

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Art. Code: 05
Sachgebiet: CTV

Memo: DE10DAR

SI

Wichtig für die Werkstatt!

Nummer: 4822 830 05012

Datum: 08.01.1998

Service Information

Betrifft: MD 2.2X E,
Entmagnetisierung

Verteiler: S1,F1

Bei Geräten mit Chassis **MD 2.2X E** kann es vorkommen, daß die geschaltete Entmagnetisierung nicht einwandfrei arbeitet. Dadurch kommt es zu einem verfärbten Bildschirm. Dieser Fehler kann auch zeitweise auftreten.

Folgende Änderung ist vorzunehmen:

■ R 3502 von 10 Ohm in 2,2 Ohm ändern	(Best.Nr. 4822 052 11228)
■ R 3531 von 2,2 kΩin 4,7 kΩ ändern	(Best.Nr. 4822 116 52283)
■ C 2513 von 100 nF in 10 µF ändern (- Pol an B von T 7514)	(Best.Nr. 4822 124 41579)

Diese Änderung ist ab KW 9743 werkseitig eingeführt.

Anlage: Schaltungsausschnitt

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PHILIPS

909

Art. Code: 05
Sachgebiet: CTV

Memo: DE10DAR

SI

Wichtig für die Werkstatt!

Nummer: 4822 830 05015

Datum: 15.04.1998

Service Information

Betrifft: MD 2.2X E,
Wireless dolby

Verteiler: S1,F1

Diese Service-Information betrifft nur MD 2.2- CTV- Geräte mit „Wireless-Dolby", also mit Surround-Funkboxen.

Als Back-up-Lösung, wenn keine Funkverbindung möglich ist, können diese Boxen auch wie gewohnt mittels Kabel mit dem CTV-Gerät verbunden werden.
In diesem drahtgebundenen Betrieb kann es vorkommen, daß die **Boxen** bei sehr leisen Tonpassagen unvermittelt **selbsttätig ein- und ausschalten**. Dies ist auch abhängig von den Lautstärkeeinstellungen.

Abhilfe:

2 Bauteile in der Stand-by-Schaltung der aktiven Surround-Box sind zu ändern bzw. zu überprüfen:

- **Pos. 2280 in 220µF ändern** **(Best.Nr. 4822 124 40196)**
- **Pos. 3280 in 330 kΩ ändern** **(Best.Nr. 4822 116 52272)**
  (Pos. 3280 ist im Service-Manual mit 330 kΩ angegeben, kann aber anders bestückt sein).

Im Service-Manual (Best-Nr. 4822 727 21486) finden Sie die Schaltung und das Printlayout auf der Seite 45.

IRIS Symptom code: 6544

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Art. Code: 05
Sachgebiet: CTV

Memo: DE10DAR

SI

Wichtig für die Werkstatt!

Nummer: 4822 830 05016

Datum: 15.04.1998

Service Information

Betrifft: MD 2.2X E
Wireless Dolby, Rauschen

Verteiler: S1,F1

Unter ungünstigen Umständen kann es vorkommen, daß der Surroundton durch die drahtlosen Funkboxen verrauscht wiedergegeben wird.

Um die Rauschanteile des Surroundtons zu vermindern, gibt es zwei Änderungsmöglichkeiten:

- Auf dem FM-Empfänger-Modul der aktiven Surround-Box sind folgende Positionen zu ändern:
  1. Pos. 3731 entfernen
  2. Pos. 3729 bestücken mit einem 4,7 kΩ-Widerstand (Best.Nr. 4822 051 20472)
  3. Pos. 3730 ändern in 4,7 kΩ (Best.Nr. 4822 051 20472)

Die Schaltung und das Printlayout des Empfängers der aktiven Surround-Box finden sie im MD 2.2 Service-Manual (4822 727 21486) auf der Seite 46.

- Auf dem FM-Sender-Modul (Pos. 1403, Manual S. 44) im CTV-Gerät ist der Widerstand 3153 (1,5 kΩ) zu entfernen. Zum FM-Sender gibt es im Service-Manual keine Printdarstellung mit Positionsnummern. In der Anlage finden Sie eine Abbildung des Moduls. Die obere Abschirmung ist für die Dauer der Arbeit zu entfernen. Der einzige 1,5 kΩ-Widerstand (Aufdruck: 152) ist mit dem weißen Kreis gekennzeichnet.

IRIS Symptom code: 1542

1

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PHILIPS

Art. Code: 05
Sachgebiet: CTV

Memo: DE10DAR

SI

Wichtig für die Werkstatt!

Nummer: 4822 830 05017

Datum: 15.04.1998

Service Information

Betrifft: MD 2.2X E, Geräusche aus der Bildröhre

Verteiler: S1,F1

Bedingt durch Bildröhrentoleranzen kann es zu leisen Geräuschen aus dem Schirm der Bildröhre kommen. Diese **brummenden oder summenden Geräusche** sind strahlstromabhängig und nur in ruhiger Umgebung zu hören.

Achtung: Nicht zu verwechseln mit Brummen der Ablenkeinheit !

Ursache ist ein leichtes mechanisches Schwingen der Streifenmaske in der Röhre.

Abhilfe:

Einbau eines sogenannten **„Bleeders"**. Die Bestellnummer lautet:

4822 310 11113

Der Bleeder wird in die Hochspannungsleitung zwischen Zeilentrafo und Anodenanschluß der Bildröhre eingebaut. Eine Einbauanleitung liegt bei.

Der Bleeder ist ab KW 9818 lieferbar.

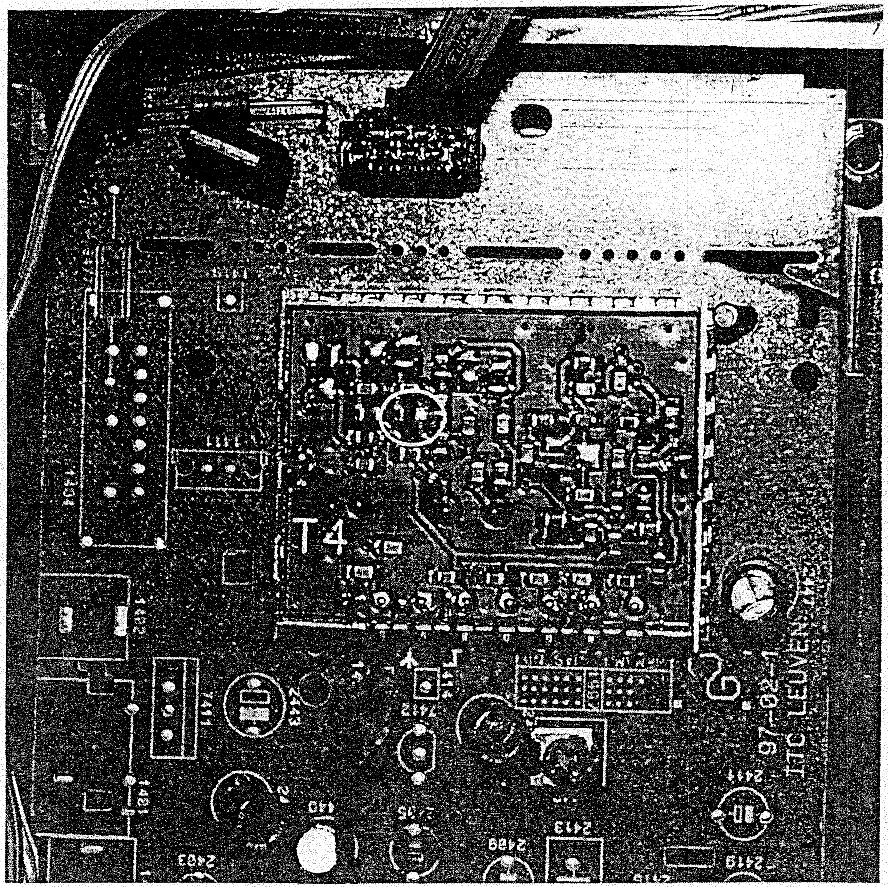
IRIS Symptom code: 2145

Hinweis: Bei Knistergeräuschen am Konus der Bildröhre siehe SI 4822 830 05013 v. 9.1.98.

Nachdruck nicht gestattet! Änderungen vorbehalten.

Anlage:

Abbildung Dolby Surround FM-Sender mit entfernter Abschirmung



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PHILIPS

5026# 1035776
909# 1021151

Art. Code: 05
Sachgebiet: CTV

Memo: DE10BEA

SI

Wichtig für die Werkstatt! 5273

Nummer: 4822 830 05020

Datum: 11.03.1999

Service Information

Betrifft: MD 2.1x ;MD 2.2x
GFL 2.20 nur 29"

Verteiler: S1,F1

Für oben aufgeführte Chassistypen sind die originalen 29" Bildröhren für den Service nicht mehr lieferbar.
Betroffene Bildröhrentypen:
A 68 ESF002X**43** Best.Nr.: 4822 131 20585
A 68 ESF002X**043** Best.Nr.: 4822 131 11232

Diese Bildröhren werden ersetzt durch folgenden Bildröhrentyp:
A 68 ESF002X**143** Best.Nr.: 4822 131 11311

Wird dieser neue Bildröhrentyp als Ersatz für eine A68ESF002X**43** verwendet,so muß das eingebaute Nord/Süd-Modul entfernt werden. Gleichzeitig ist folgende Drahtbrücke zu bestücken:

GFL 2.20: Drahtbrücke Pos. 9279 bestücken
MD 2.12 : Drahtbrücke Pos. 9621 bestücken

Wird dieser neue Bildröhrentyp als Ersatz für eine A68ESF002X**043** verwendet sind keine Modifikationen notwendig.

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PHILIPS

5026# 1035776
905# 102161

Art. Code: 05
Sachgebiet: CTV

Memo: DE10BEA

SI

Wichtig für die Werkstatt! 5294

Nummer: 4822 830 05021

Datum: 17.03.1999

Service Information

Betrifft: MD 2.1x ;MD 2.2x
MG 2.1

Verteiler: S1,F1

Kritische Kunden reklamieren unter Umständen bei High-End-Geräten
Mit 25/29" - 4:3 oder 28" – 16:9 Bildröhren folgende Erscheinungen:

- ■ Knistern am Konus der Bildröhre, besonders bei starken hell/dunkel-Sprüngen des Bildinhaltes
- ■ Leise summende oder brummende Geräusche aus der Front der Bildröhre, abhängig vom Bildinhalt (nicht zu verwechseln mit brummenden Ablenkeinheiten)

In beiden Fällen ist wie folgt vorzugehen:

→ prüfen Sie,ob bereits ein Bleeder nachgerüstet wurde (siehe dazu SI: 4822 830 05017 vom 15.04.1998)
→ bei weiteren Beanstandungen bringt nachträgliches auftragen des sogenannten ACC-Belages unterhalb der Ablenkeinheit Abhilfe.

Die Bestellnummer für den flüssigen ACC-Belag lautet: 4822 390 10166

Eine detaillierte Anweisung zum aufbringen von ACC liegt im Anhang bei

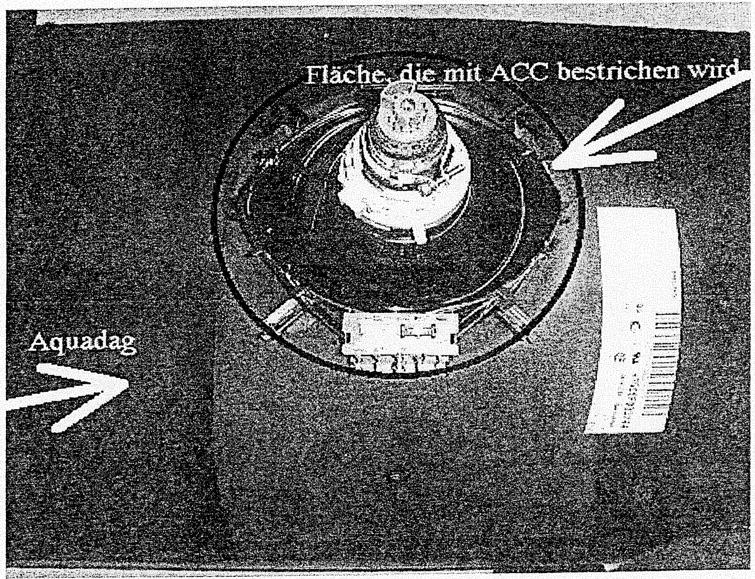
IRIS-Codes: 2141 bzw. 2145

PHILIPS Consumer Service GmbH **2.10.98**
Trade Support CTV/SAT

Reparaturmethode bei leisem Brummen an der Front und Knistern am Konus von Bildröhren.

Bitte lesen Sie zunächst die gesamte Anleitung, bevor Sie beginnen

Diese Methode darf nur von entsprechend geschulten Fernseh-Servicetechnikern ausgeführt werden.



Röhre mit ACC (Anti Crackling Coating=Anti Knister Belag) versehen (nur wenn nicht schon ab Fabrik vorhanden).

Prüfen Sie die Geometrieeigenschaften wie Rasterrotation, Konvergenz und Farbreinheit des Gerätes, so daß Sie einen Eindruck über die jetzige Einstellung des Gerätes gewinnen, die Sie später wieder erreichen sollten. Verschaffen Sie sich auch einen guten Überblick über das „Brummniveau" bzw. über das Knisterverhalten beim Ein-Ausschalten sowie bei Lastwechseln von hohen Helligkeiten zu dunklem Schirm.

Gerät spannungsfrei schalten, öffnen.

Lösen Sie die Anschlüsse der Ablenkeinheit, ziehen Sie den Bildröhrensockel ab, lösen Sie die Halsklemmenschraube. Schneiden Sie mit einer Rasierklinge das Silikon durch, welches die Ablenkeinheit zusätzlich auf der Röhre fixiert, und zwar so, daß jeweils ein Teil Silikon an der Röhre und an der Ablenkeinheit zurückbleibt. So ist zum Schluß eine einfachere mechanische Justage möglich. Markieren Sie in Richtung Anode (Norden) mit einem Filzstift die oberhalb der Ablenkeinheit die maximale Fläche, die bestrichen werden darf, ca. 20cm im Durchmesser.
Legen sie das Gerät auf den Bildröhrenschirm (weiche Unterlage !).

Schütteln Sie den ACC Behälter kräftig durch, damit die Sedimente wieder eingemischt werden.
Geben Sie, auf eine im Baumarkt erhältliche kleine Farbrolle, ACC aus dem Behälter auf die Rolle. Beginnen Sie um den Bildröhrenhals ACC auf die unbedeckte Glasfläche aufzutragen. Vermeiden Sie noch, den bestehenden Aquadagbelag zu berühren. Bestreichen Sie den Hals soweit, daß er ca. 3 cm über der Halsansetzstelle (Verbindung von Hals zu Konus) bedeckt ist. Zuletzt stellen Sie eine leitende Verbindung zwischen ACC und Aquadag her, durch überrollen des Randes vom Aquadagbelag. Da Aquadag niederohmig ist, ACC hochohmig, vermeiden Sie Aquadag anzulösen und in ACC einzubringen. Diese Untermengung kann später Hochspannungsprobleme hervorrufen. Die Hochspannung benutzt die „Aquadaginseln" im ACC Belag unterhalb der Ablenkeinheit, um zu ihr überzuschlagen.

Trocknen Sie die Fläche mit einem Haartrockner.

Setzen Sie die Ablenkeinheit wieder auf, fixieren Sie sie im bestehenden Silikon, ziehen Sie die Halsklemmenschraube leicht fest.

Setzen Sie das Gerät wieder in die Normalposition und schließen alle Anschlüsse wieder an. Das Gerät kann jetzt eingeschaltet werden. Stellen Sie ein Gittermustertestbild ein und positionieren die Rasterrotation, indem Sie die Halsklemmenschraube lösen und leicht durch Drehung der Ablenkeinheit nach links oder rechts nachstellen. Ziehen Sie die Halsklemmenschraube mit einem max. Drehmoment von 100Ncm wieder fest. **Achtung:** Sie können bei zu hohen Drehmomenten Halsbruch verursachen.

Sie sollten jetzt ein deutlich vermindertes Niveau des Brummens der Röhre sowie des Knistern bei Lastwechseln wahrnehmen können.

Schließen Sie das Gerät.

Colour television **Chassis**

MD 2.21 E
2.22 E
2.23 E
AA

Service
Service
Service

Service Manual

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PCS 91 143 GB

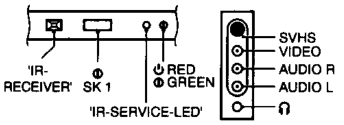
1. Technical specifications

Mains voltage : 220 - 240 V (± 10%)
: 50 Hz - 60 Hz (± 5%)
Aerial input impedance : 75 Ω - koaxial
Minimum aerial voltage : 30 μV (VHF), 40 μV (UHF)
Maximum aerial voltage VHF/S/UHF : 180 mV

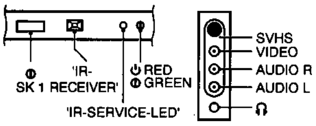
Programmes : 0 - 99
VCR programmes : 0, 50 - 99

2. Connection facilities

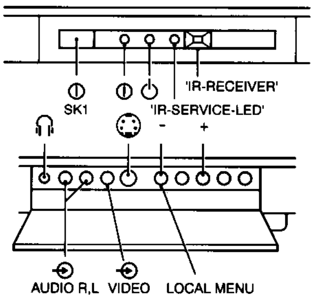
TOP CONTROL STYLING MIDDLE (FL6A)

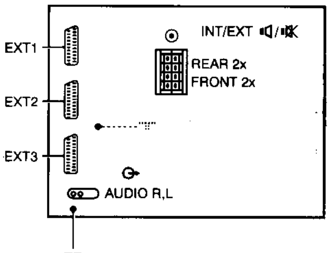

'IR-RECEIVER'
SK 1
RED
GREEN
'IR-SERVICE-LED'
SVHS
VIDEO
AUDIO R
AUDIO L

TOP CONTROL STYLING RIGHT (FL6B)


SK 1
'IR-RECEIVER'
RED
GREEN
'IR-SERVICE-LED'
SVHS
VIDEO
AUDIO R
AUDIO L

TOP CONTROL STYLING (FL5)


SK1
'IR-SERVICE-LED'
-
+
'IR-RECEIVER'
AUDIO R,L
VIDEO
LOCAL MENU


EXT1
EXT2
EXT3
INT/EXT
REAR 2x
FRONT 2x
AUDIO R,L

CL 76532013_005.AI
200297

Specification of the connectors

EXT 1 (AUX): RGB+CVBS

1	Audio ○→ R ($0.5V_{RMS} \le 1k\Omega$)
2	Audio →○ R ($0.5V_{RMS} \ge 10k\Omega$)
3	Audio ○→ L ($0.5V_{RMS} \le 1k\Omega$)
4	Audio ⊥
5	Blue ⊥
6	Audio →○ L ($0.5V_{RMS} \ge 10k\Omega$)
7	Blue ($0.7V_{pp}/75\Omega$)
8	CVBS-status →○ 0-1.3V: INT 4.5-7V: EXT 16:9 9.5-12V: EXT 4:3
9	Green ⊥
10	-
11	Green ($0.7V_{pp}/75\Omega$)
12	-
13	Red ⊥
14	RGB-status ⊥
15	Red ($0.7V_{pp}/75\Omega$)
16	RGB-status (0-0.4V: INT) (1-3V: EXT/75Ω)
17	CVBS ⊥
18	CVBS ⊥
19	CVBS ○→ ($1V_{pp}/75\Omega$)
20	CVBS →○ ($1V_{pp}/75\Omega$)
21	Earthscreen

EXT2 (VCR): SVHS+CVBS+RGB

1	Audio ○→ R ($0.5V_{RMS} \le 1k\Omega$)
2	Audio →○ R ($0.5V_{RMS} \ge 10k\Omega$)
3	Audio ○→ L ($0.5V_{RMS} \le 1k\Omega$)
4	Audio ⊥
5	Blue ⊥
6	Audio →○ L ($0.5V_{RMS} \ge 10k\Omega$)
7	Blue ($0.7V_{pp}/75\Omega$)/C-out (project 50)
8	CVBS-status →○ 0-1.3V: int 4.5-7V: EXT 16:9 9.5-12V: EXT 4:3
9	Green ⊥
10	Control (project 50)
11	Green ($0.7V_{pp}/75\Omega$)
12	-
13	Red ⊥
14	RGB-status ⊥
15	Red ($0.7V_{pp}/75\Omega$), C-in/out
16	RGB-status (0-0.4V: INT) (1-3V: EXT/75Ω)
17	CVBS ⊥
18	CVBS ⊥
19	CVBS/Y ○→ ($1V_{pp}/75\Omega$)
20	CVBS/Y →○ ($1V_{pp}/75\Omega$)
21	Earthscreen

EXT3: CVBS+audio

1	-
2	Audio →○ R ($0.5V_{RMS} \ge 10k\Omega$)
3	-
4	Audio ⊥
5	-
6	Audio →○ L ($0.5V_{RMS} \ge 10k\Omega$)
7	-
8	-
9	-
10	-
11	-
12	-
13	-
14	-
15	-
16	-
17	CVBS ⊥
18	CVBS ⊥
19	-
20	CVBS →○ ($1V_{pp}/75\Omega$)
21	Earthscreen

Front

◎ CINCH Video →○ $1V_{pp}/75\Omega$
◎ CINCH Audio →○ L ($2V_{RMS}$; ≥ 10kΩ)
◎ CINCH Audio →○ R ($2V_{RMS}$; ≥ 10kΩ)

◎ 3.5mm ◁/🎧 32-2000Ω ≥ 10mW

SVHS

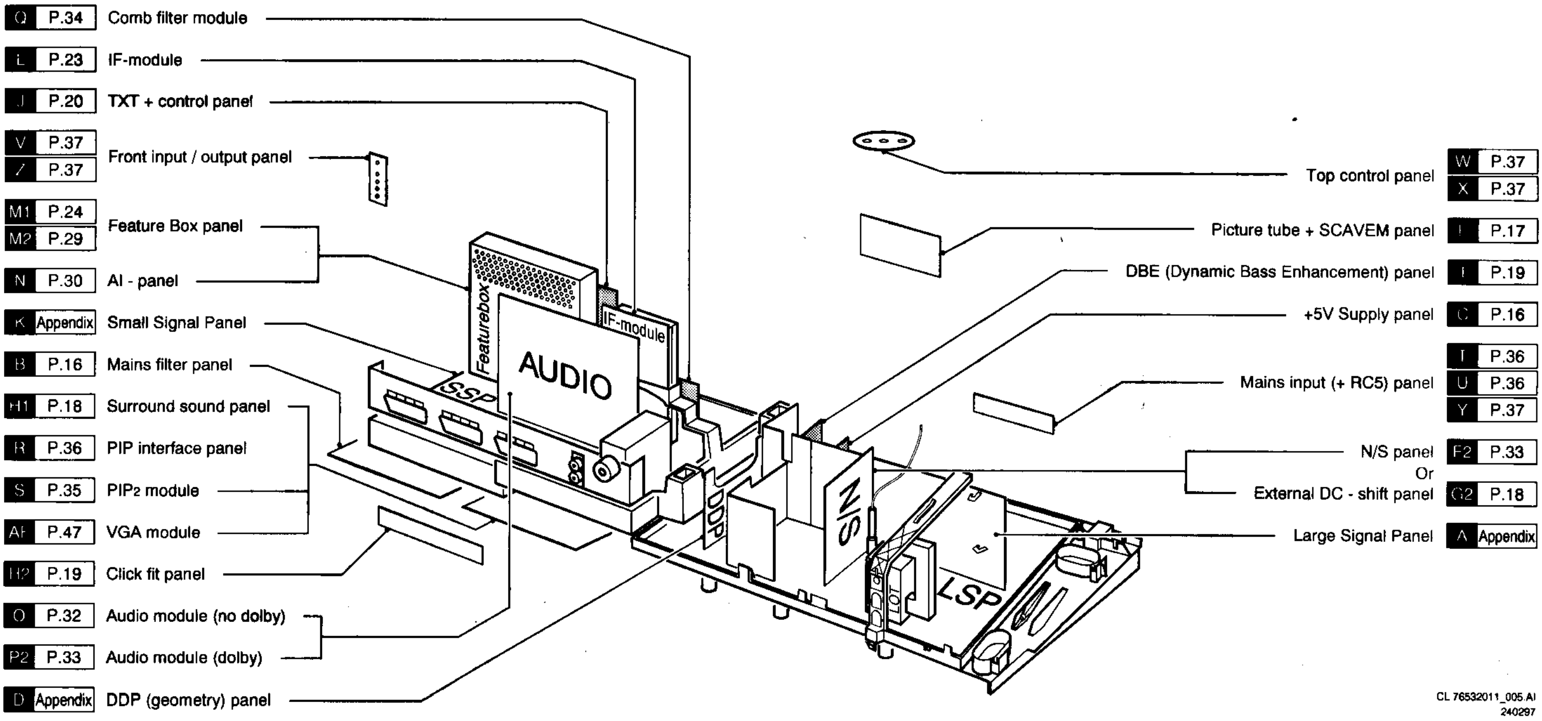
1	⊥
2	⊥
3	Y →○ ($1V_{pp}$; 75Ω)
4	C →○ ($0.3V_{pp}$; 75Ω)

Audio out (rear)

◎ CINCH Audio ○→ L ($0.5V_{RMS}$; ≤ 1kΩ)
◎ CINCH Audio ○→ R ($0.5V_{RMS}$; ≤ 1kΩ)

Chassis overview

Non Top Dolby version


Q P.34 Comb filter module
L P.23 IF-module
J P.20 TXT + control panel
V P.37
Z P.37 Front input / output panel
M1 P.24
M2 P.29 Feature Box panel
N P.30 AI - panel
K Appendix Small Signal Panel
B P.16 Mains filter panel
H1 P.18 Surround sound panel
R P.36 PIP interface panel
S P.35 PIP2 module
AF P.47 VGA module
H2 P.19 Click fit panel
O P.32 Audio module (no dolby)
P2 P.33 Audio module (dolby)
D Appendix DDP (geometry) panel
Top control panel W P.37 X P.37
Picture tube + SCAVEM panel E P.17
DBE (Dynamic Bass Enhancement) panel I P.19
+5V Supply panel C P.16
Mains input (+ RC5) panel T P.36 U P.36 Y P.37
N/S panel F2 P.33
Or
External DC - shift panel G2 P.18
Large Signal Panel A Appendix
Featurebox
IF-module
AUDIO
SSP
DDP
N/S
LOT
LSP
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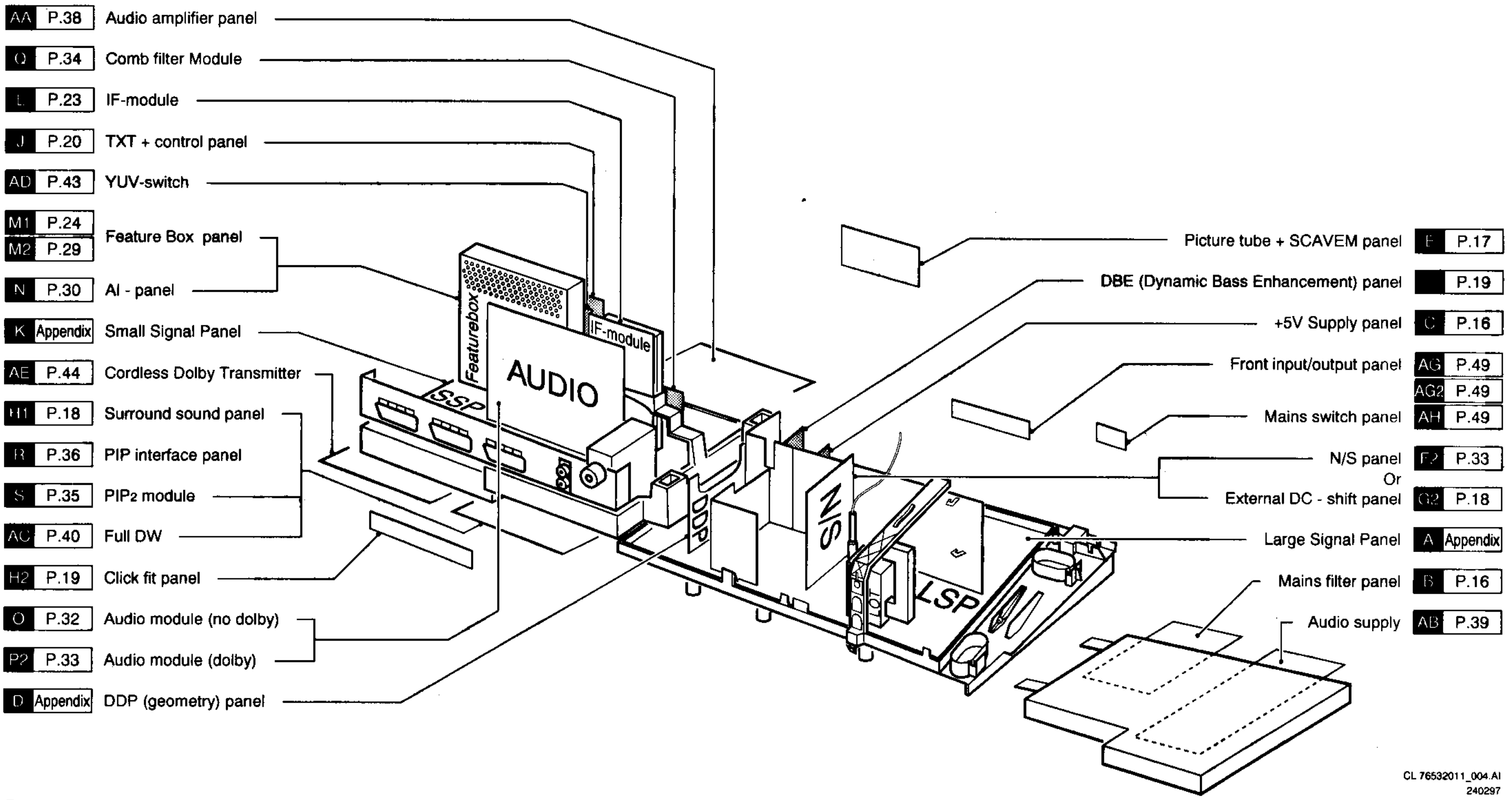
Top Dolby version


AA P.38 Audio amplifier panel
Q P.34 Comb filter Module
L P.23 IF-module
J P.20 TXT + control panel
AD P.43 YUV-switch
M1 P.24
M2 P.29 Feature Box panel
N P.30 AI - panel
K Appendix Small Signal Panel
AE P.44 Cordless Dolby Transmitter
H1 P.18 Surround sound panel
R P.36 PIP interface panel
S P.35 PIP2 module
AC P.40 Full DW
H2 P.19 Click fit panel
O P.32 Audio module (no dolby)
P2 P.33 Audio module (dolby)
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DBE (Dynamic Bass Enhancement) panel I P.19
+5V Supply panel C P.16
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Mains switch panel AH P.49
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Or
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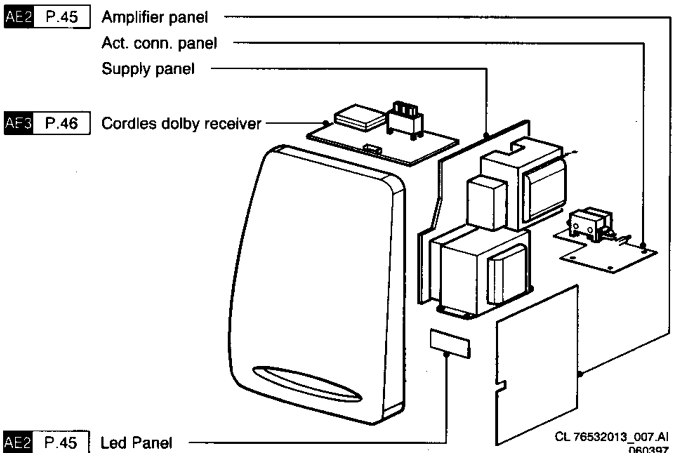
Featurebox
IF-module
AUDIO
SSP
DDP
N/S
LOT
LSP
CL 76532011_004.AI
240297

Cordless Dolby Receiver


AE2 P.45 Amplifier panel
Act. conn. panel
Supply panel
AE3 P.46 Cordles dolby receiver
AE2 P.45 Led Panel
CL 76532013_007.AI
060397

3. Safety instructions, Maintenance instructions,

Safety instructions for repairs

1. Safety regulations require that during a repair:

- the set should be connected to the mains via an isolating transformer
- safety components, indicated by the symbol ▲ should be replaced by components identical to the original ones
- when replacing the CRT, safety goggles must be worn

2. Safety regulations require that after a repair the set must be returned in its original condition. In particular attention should be paid to the following points:

- As a strict precaution, we advise you to resolder the solder joints through which the horizontal deflection current is flowing, in particular:
    - all pins of the line output transformer (LOT);
    - fly-back capacitor(s);
    - S-correction capacitor(s);
    - line output transistor;
    - pins of the connector with wires to the deflection coil;
    - other components through which the deflection current flows.

Note:
This resoldering is advised to prevent bad connections due to metal fatigue in solder joints and is therefore only necessary for television sets older than 2 years.

- The wire trees and EHT cable should be routed correctly and fixed with the mounted cable clamps.
- The insulation of the mains lead should be checked for external damage.
- The mains lead strain relief should be checked for its function in order to avoid touching the CRT, hot components or heat sinks.
- The electrical DC resistance between the mains plug and the secondary side should be checked (only for sets which have a mains isolated power supply). This check can be done as follows:
    - unplug the mains cord and connect a wire between the two pins of the mains plug;
    - set the mains switch to the on position (keep the mains cord unplugged!);
    - measure the resistance value between the pins of the mains plug and the metal shielding of the tuner or the aerial connection on the set. The reading should be between 4.5 MΩ and 12 MΩ;
    - switch off the TV and remove the wire between the two pins of the mains plug.
- The cabinet should be checked for defects to avoid touching of any inner parts by the customer.

Maintenance instruction

It is recommended to have a maintenance inspection carried out by a qualified service employee. The interval depends on the usage conditions:

- when the set is used under normal circumstances, for example in a living room, the recommended interval is 3 to 5 years;
- when the set is used in circumstances with higher dust, grease or moisture levels, for example in a kitchen, the recommended interval is 1 year.

The maintenance inspection contains the following actions:

- execute the above mentioned 'general repair instruction';
- clean the power supply and deflection circuitry on the chassis;
- clean the picture tube panel and the neck of the picture tube.

Warnings

1. In order to prevent damage to ICs and transistors, all high-voltage flashovers must be avoided. In order to prevent damage to the picture tube, the method shown in Fig. 3.1 should be used to discharge the picture tube. Use a high-voltage probe and a multimeter (position DC-V). Discharge until the meter reading is 0V (after approx. 30s).

2. **ESD** ⚠

All ICs and many other semiconductors are sensitive to electrostatic discharges (ESD). Careless handling during repair can drastically shorten the life. Make sure that during repair you are connected by a pulse band with resistance to the same potential as the earth ot the unit. Keep components and tools also at this same potential.

3. Together with the deflection unit and any multipole unit, the flat square picture tubes used form an integrated unit. The deflection and the multipole units are set optimally at the factory. Adjustment of this unit during repair is therefore not recommended.

4. Be careful when taking measurements in the high-voltage section and on the picture tube.

5. Never replace modules or other components while the unit is switched on.

6. When making settings, use plastic rather than metal tools. This will prevent any short circuits and the danger of a circuit becoming unstable.

7. On this unit the 141 volt supply voltage is not supplied via an interconnection on the deflection yoke to the line output transformer. Whenthe deflection cable is detached, the + 141 volt supply remeins loaded. In orderto unload the + 141 volts, coil 5136 should be removed.

Warnings and Notes

Notes

1. The direct voltages and oscillograms should be measured with regard to the tuner earth (⊥), or hot earth (⊥ϟ) as this is called.

2. The direct voltages and oscillograms shown in the diagrams should be measured in the **Service Default Mode** (see chapter 6) with a colour bar signal and stereo sound (L: 3 kHz, R: 1 kHz unless stated otherwise) and picture carrier at 475.25 MHz.

3. Where necessary, the oscillograms and direct voltages are measured with (⊤) and without aerial signal (⊤̸). Voltages in the power supply section are measured both for normal operation (⌽) and in standby (⏻). These values are indicated by means of the appropriate symbols.

4. The picture tube PWB has printed spark gaps. Each spark gap is connected between an electrode of the picture tube and the Aquadag coating.

5. The semiconductors indicated in the circuit diagram and in the parts lists are completely interchangeable per position with the semiconductors in the unit, irrespective of the type indication on these semiconductors.

6. **DOLBY SURROUND**
   PRO • LOGIC

   Manufactured under license from Dolby Laboratories Licensing Corporation.
   DOLBY, the double-D symbol ᗡD and PRO LOGIC are trademarks of Dolby Laboratories Licensing Corporation.

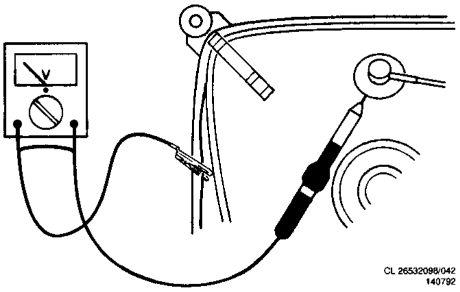


Fig. 3.1

4. Mechanical instructions

The MD2 chassis has predefined service positions for different panels. To get access to the chassis, first do the following steps:

1. Unscrew the 4 screws fixing the rear cover to the rear cover plate (cover plate with the scart plugs).
2. Unclick the 4 clicks at the top side and upper left and right side by pushing (no torquing is required) the clicks while pushing the rear cover a little.
3. Unscrew the remaining 4 screws.
4. Take of the rear cover.

Service position LSP component side

1. Remove the subwoofer by disconnecting the cable and lift it.
2. Put the SSP in the horizontal service position (see horizontal service position SSP) or the 30 degree position.
3. Remove the screw (1) in the bracket of the LOT. Remove this bracket by pushing the click (2) en pull it upwards.
4. Release clicks (3) and (4).
5. Lift the LSP PWB out of its bracket and pull it a little back.

PS: After taking out the mains cord from its fixation clicks, the entire bottom plate with the chassis in it can be released from the cabinet and then shifted back to create more space.

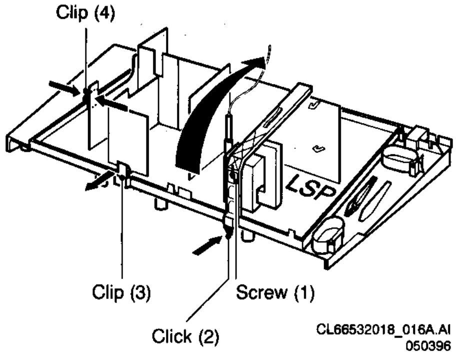


Fig. 4.1

Service position LSP copper side

Two possibilities:

With a table:

1. Bring the LSP in the service position component side (see above).
2. Take all wiring out of the fixation brackets (on the rear side of the chassis and under the picture tube).
3. Dismount the mains input panel from the SSP bracket and lay it on the table (this gives more freedom of the mains cable N01-L01).
4. Disconnect the degaussing coil (connector L02).
5. Disconnect the rotation coil (connector Y90) if fitted.
6. Carefully pull back the LSP and put it on its front side.

Without a table by making use of cable extension kit 4822 310 10674:

1. Disconnect all cables at the LSP side.
2. By now the LSP can be turned to a vertical position (5), copper side at the right hand with the LOT above. For this vertical position special slides are made in the bottom plate of the cabinet.
3. The LSP can be fixed to the bottom plate by using the special pin marked M2. This pin is part of the bottom plate and must be broken out and placed into the hole (6) in the bottom plate.
4. Now reconnect L11-S11, L15-S15, L10-S10 and L01-N01 by **replacing** the cables by the cables of the cable extension kit 4822 310 10674.
5. By now the video processing is totally reconnected.
6. In case audio reproduction is required:
   For non-dolby sets:
   - Reconnect the Audio Module to the audio amplifier on the LSP (I28-L28).
   - Disconnect the plug at the left speaker side (seen from the rear).
   - Reconnect the green connector L38 (now the right speaker (seen from the rear) is connected).

   For dolby sets the centre speaker can be used or the Left and Right speaker by connecting this cable to V32 on the Surround Sound panel.

Remark: Leave the special pin in the special hole on the bottom plate of the set after the repair.

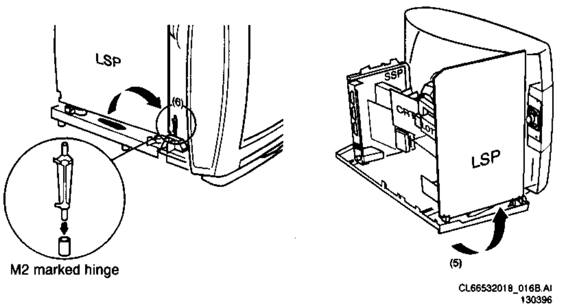


Fig. 4.2

Vertical service position SSP (solder side)

1. To reach for the SSP first the plastic rear cover plate (7) must be removed by putting a screwdriver in the hole (8) and move it upwards. Now the rear cover plate can be removed by lifting it in the direction of the arrow.

2. To have access to the copper side of the SSP, the brackets clicked on the left side (seen from the back) from the SSP bracket must be removed:
   - Upper bracket; Pushing the click (9) away and slide the bracket according the arrow upwards.
   - Lower bracket; First dismount the upper bracket, then push click (10) away and pulling it upwards according the arrow.

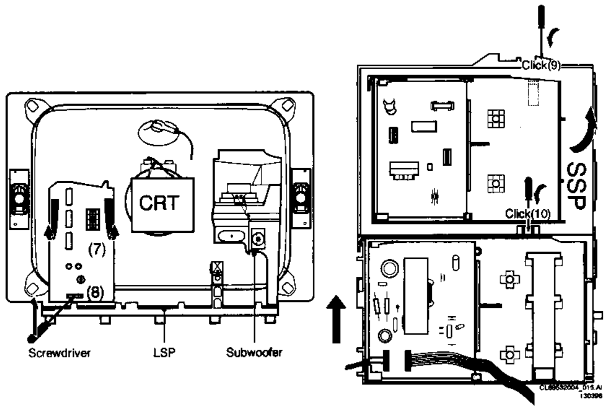


Fig. 4.3

Horizontal service position SSP (component side)

1. Push down the clicks of the SSP bracket (11) and simultaneously shift the complete SSP bracket including panels to the left (seen from the rear).

2. Take the SSP bracket (including all panels) out of the bottom plate and shift it a little to the right (seen from the side).

3. Put the SSP-bracket in the special holes on the bottom plate.

4. Now the SSP component side and all the panels mounted on the SSP are accessible.

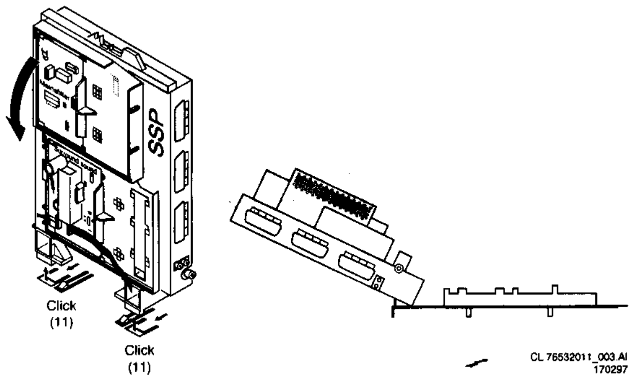


Fig. 4.4

Extra service position SSP for front operation (FL5)

1. Push the clicks of the SSP bracket down and at the same time slide the entire SSP bracket, including the panels, to the left (viewed from the rear)

2. Where necessary remove the wiring from its clicks

3. Tilt the SSP bracket (with all panels) into its 30 degree position

This 'extra' service position for the SSP bracket can be used in all MD2.2 sets.

Service position Feature Box by using cable extension kit 4822 310 10674

With the use of the same extension kit as used for the vertical LSP service position, the Feature Box can be placed away from the SSP.

1. Put the SSP in the horizontal service position.

2. Remove the fixation bracket which holds the feature box and the IF-module by unscrewing the 2 screws (12) and then take out the fixation bracket. Take care for the 2 clicks of this bracket clicked in the feature Box shielding.

3. Click out the Feature Box and connect it to the SSP making use of the cable extension kit 4822 310 10674.

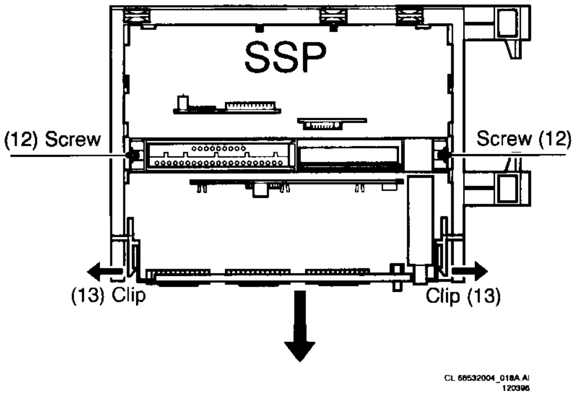


Fig. 4.5

Service position SSP PWB

First remove all cables where needed. Then remove the screws (12) in the bracket. The SSP PWB can be removed after loosing the two clicks (13), then slided backwards (in the direction of the arrow on the SSP bracket) and then taken out of the bracket.

Mechanical instructions

Removing the small panels out of brackets clicked on the SSP bracket

To dismount the panels itself which are mounted in the brackets clicked on the SSP bracket, the following has to be done:

- Upper panel; Open click 14 and 15 and take out the panel mounted in the upper bracket. Lay the panel on a table.
- Lower panel; Open click 16 and 17 and take out the panel mounted in the lower bracket. Lay the panel on a table.

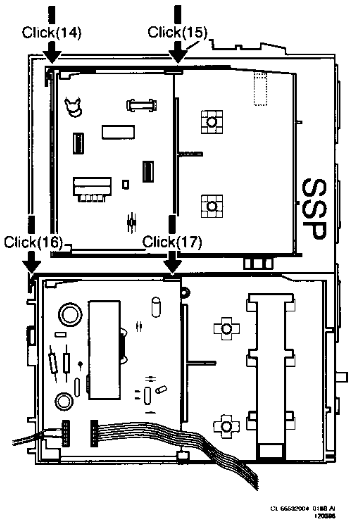


Fig. 4.6

Two possibilities:

Service position bracket including panels:

1. Remove the fixing bracket by means of its clicks.
2. Remove the subwoofer so that a place is created to be able to remove the module directly.
3. Push both clicks (18 + 19), which secure the large bracket to the bottom plate, upwards at the same time.
4. Pull the entire module to the back while the clicks are being held up.
5. Remove the entire bracket, including the modules, from the bottom plate.
6. Lay the entire module with the modules, pointing upwards, on the bottom plate.

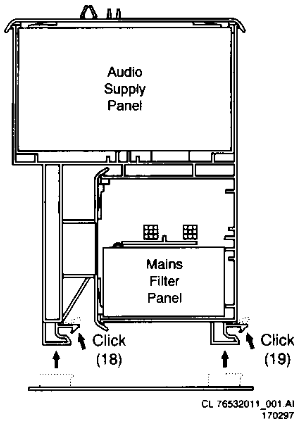


Fig. 4.7

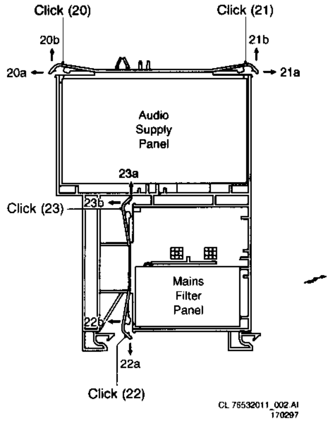


Fig. 4.8

Service position of the 'Audio Power Supply' or the 'Mains Filter' itself:

1. Leave the large bracket in its vertical position, but remove the fixing bracket between the large bracket and the subwoofer.
2. Click the large clicks on the large bracket free.
   - ⁎ For the 'Audio Power Supply' the two large clicks (20 + 21) on the top.
   - ⁎ For the 'Mains Filter' the large click on the bottom left (22) and then the small click halfway on the left (23).
3. Remove the wiring from its clamps.
4. The module can now be removed from the bracket and placed on a table.
5. During assembly make sure that the module is re-clamped correctly BEHIND its grip.

Service position VGA interface panel in the 28"

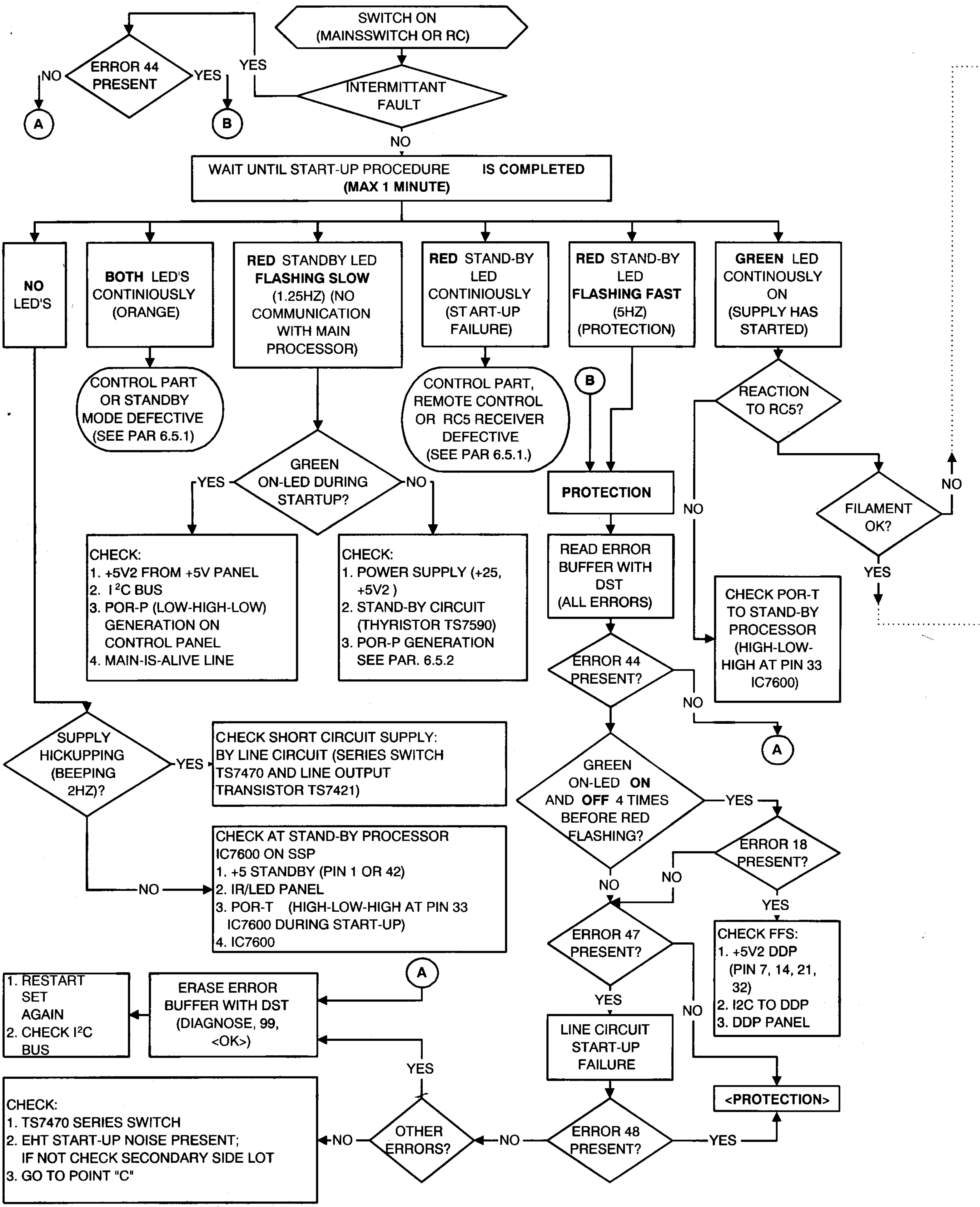
1. Carefully remove the entire bottom plate including LSP and SSP from the cabinet and place it a few centimetres to the rear (watch out for the picture tube panel).
2. Pull the wiring loose to the front.
3. Click the VGA interface panel free.

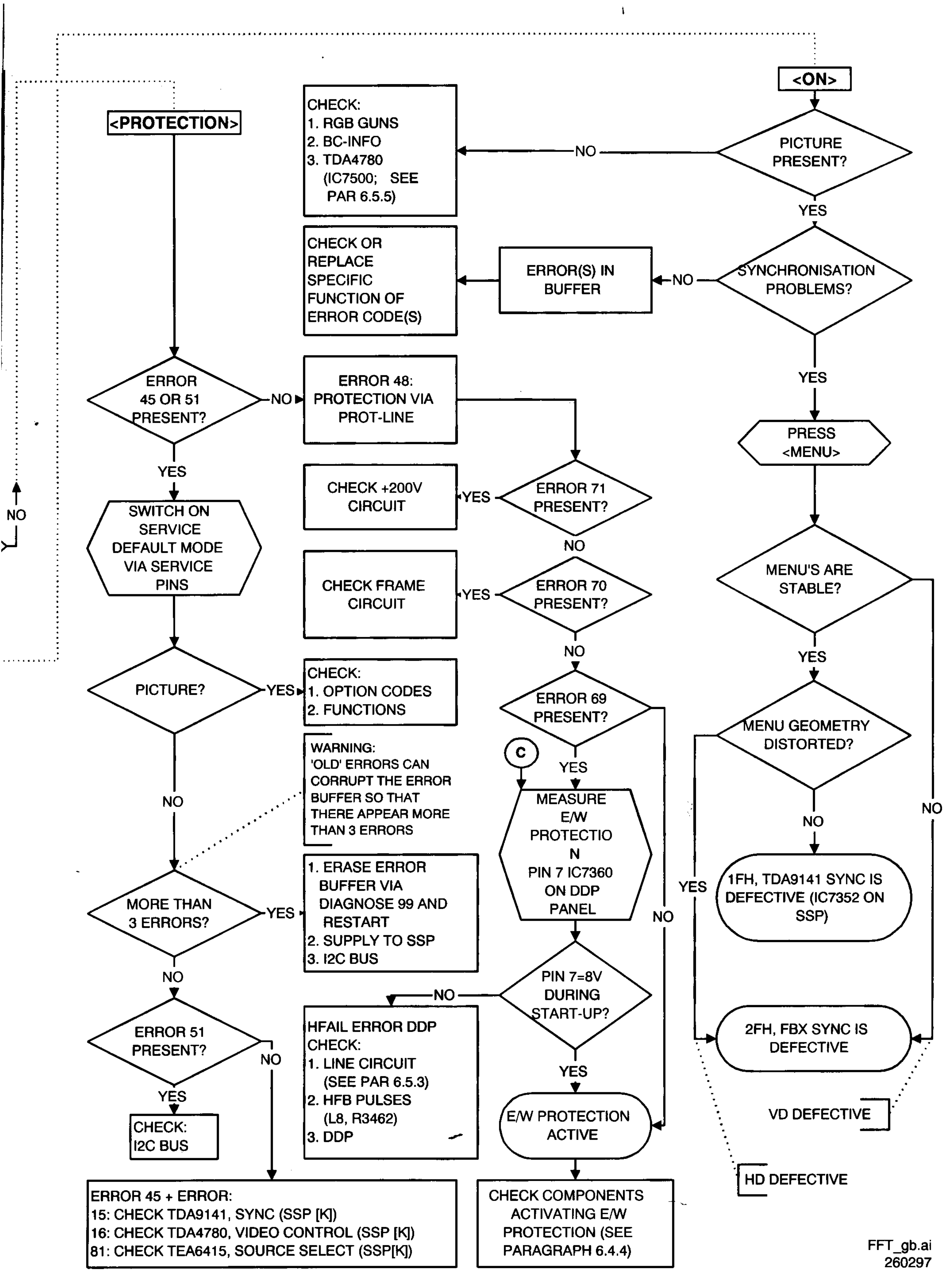
Service position front operation

In sets with front operation (FL5 styling), knobs and LED's are located under the picture tube. All front panels and centre loudspeakers are mounted in a plastic bracket which can be removed in its entirety.

1. In order to be able to remove the bracket, the screws between the picture tube and the bottom plate on the inside of the cabinet are to be removed together with the screws which are located on the bottom of the cabinet. In order to be able to remove these screws easily the set will have to be turned. It is preferred that the set is turned with the back cover fitted.Turn the set so that the picture tube is pointing down and place the set carefully onto a soft and clean surface.
2. After the screws have been removed the set can be brought back to the normal position.
3. After removing the screws on the inside, the bracket can be removed via the bottom.

6. Service modes, DST, Error messages, Protections, Fa


SWITCH ON (MAINSSWITCH OR RC)
INTERMITTANT FAULT
YES
NO
ERROR 44 PRESENT
NO
YES
A
B
WAIT UNTIL START-UP PROCEDURE IS COMPLETED (MAX 1 MINUTE)
NO LED'S
BOTH LED'S CONTINIOUSLY (ORANGE)
RED STANDBY LED FLASHING SLOW (1.25HZ) (NO COMMUNICATION WITH MAIN PROCESSOR)
RED STAND-BY LED CONTINIOUSLY (START-UP FAILURE)
RED STAND-BY LED FLASHING FAST (5HZ) (PROTECTION)
GREEN LED CONTINOUSLY ON (SUPPLY HAS STARTED)
CONTROL PART OR STANDBY MODE DEFECTIVE (SEE PAR 6.5.1)
CONTROL PART, REMOTE CONTROL OR RC5 RECEIVER DEFECTIVE (SEE PAR 6.5.1.)
B
REACTION TO RC5?
GREEN ON-LED DURING STARTUP?
YES
NO
PROTECTION
NO
FILAMENT OK?
NO
YES
CHECK: 1. +5V2 FROM +5V PANEL 2. I²C BUS 3. POR-P (LOW-HIGH-LOW) GENERATION ON CONTROL PANEL 4. MAIN-IS-ALIVE LINE
CHECK: 1. POWER SUPPLY (+25, +5V2) 2. STAND-BY CIRCUIT (THYRISTOR TS7590) 3. POR-P GENERATION SEE PAR. 6.5.2
READ ERROR BUFFER WITH DST (ALL ERRORS)
CHECK POR-T TO STAND-BY PROCESSOR (HIGH-LOW-HIGH AT PIN 33 IC7600)
ERROR 44 PRESENT?
NO
A
SUPPLY HICKUPPING (BEEPING 2HZ)?
YES
CHECK SHORT CIRCUIT SUPPLY: BY LINE CIRCUIT (SERIES SWITCH TS7470 AND LINE OUTPUT TRANSISTOR TS7421)
GREEN ON-LED ON AND OFF 4 TIMES BEFORE RED FLASHING?
YES
ERROR 18 PRESENT?
NO
NO
YES
CHECK AT STAND-BY PROCESSOR IC7600 ON SSP 1. +5 STANDBY (PIN 1 OR 42) 2. IR/LED PANEL 3. POR-T (HIGH-LOW-HIGH AT PIN 33 IC7600 DURING START-UP) 4. IC7600
NO
ERROR 47 PRESENT?
CHECK FFS: 1. +5V2 DDP (PIN 7, 14, 21, 32) 2. I2C TO DDP 3. DDP PANEL
YES
NO
A
1. RESTART SET AGAIN 2. CHECK I²C BUS
ERASE ERROR BUFFER WITH DST (DIAGNOSE, 99, <OK>)
LINE CIRCUIT START-UP FAILURE
YES
<PROTECTION>
CHECK: 1. TS7470 SERIES SWITCH 2. EHT START-UP NOISE PRESENT; IF NOT CHECK SECONDARY SIDE LOT 3. GO TO POINT "C"
NO
OTHER ERRORS?
NO
ERROR 48 PRESENT?
YES


<ON>
PICTURE PRESENT?
NO
CHECK:
1. RGB GUNS
2. BC-INFO
3. TDA4780 (IC7500; SEE PAR 6.5.5)
YES
SYNCHRONISATION PROBLEMS?
NO
ERROR(S) IN BUFFER
CHECK OR REPLACE SPECIFIC FUNCTION OF ERROR CODE(S)
YES
PRESS <MENU>
MENU'S ARE STABLE?
YES
NO
MENU GEOMETRY DISTORTED?
NO
YES
1FH, TDA9141 SYNC IS DEFECTIVE (IC7352 ON SSP)
2FH, FBX SYNC IS DEFECTIVE
VD DEFECTIVE
HD DEFECTIVE
<PROTECTION>
ERROR 45 OR 51 PRESENT?
NO
ERROR 48: PROTECTION VIA PROT-LINE
YES
SWITCH ON SERVICE DEFAULT MODE VIA SERVICE PINS
NO
ERROR 71 PRESENT?
YES
CHECK +200V CIRCUIT
NO
ERROR 70 PRESENT?
YES
CHECK FRAME CIRCUIT
NO
ERROR 69 PRESENT?
YES
NO
C
MEASURE E/W PROTECTION PIN 7 IC7360 ON DDP PANEL
PIN 7=8V DURING START-UP?
NO
HFAIL ERROR DDP CHECK:
1. LINE CIRCUIT (SEE PAR 6.5.3)
2. HFB PULSES (L8, R3462)
3. DDP
YES
E/W PROTECTION ACTIVE
CHECK COMPONENTS ACTIVATING E/W PROTECTION (SEE PARAGRAPH 6.4.4)
PICTURE?
YES
CHECK:
1. OPTION CODES
2. FUNCTIONS
NO
WARNING: 'OLD' ERRORS CAN CORRUPT THE ERROR BUFFER SO THAT THERE APPEAR MORE THAN 3 ERRORS
MORE THAN 3 ERRORS?
YES
1. ERASE ERROR BUFFER VIA DIAGNOSE 99 AND RESTART
2. SUPPLY TO SSP
3. I2C BUS
NO
ERROR 51 PRESENT?
YES
CHECK: I2C BUS
NO
ERROR 45 + ERROR:
15: CHECK TDA9141, SYNC (SSP [K])
16: CHECK TDA4780, VIDEO CONTROL (SSP [K])
81: CHECK TEA6415, SOURCE SELECT (SSP[K])

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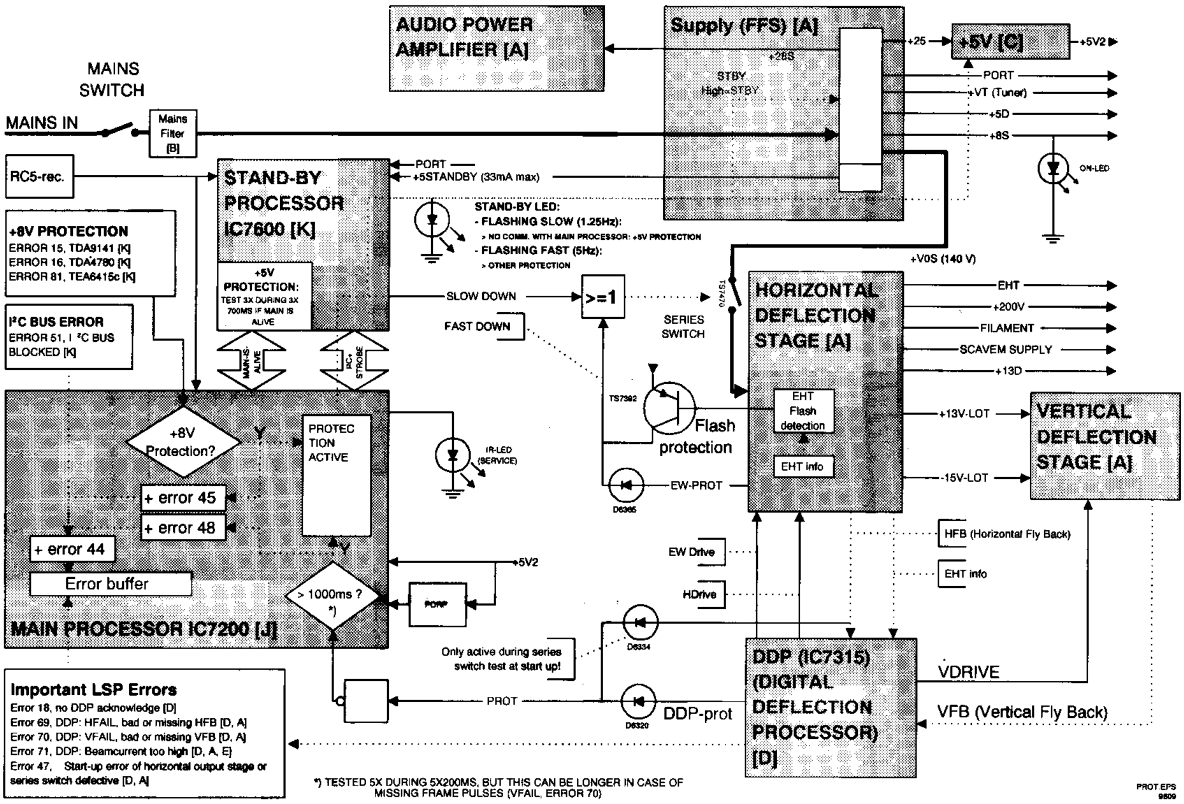
Protection diagram

MD 2.21/2.22/2.23 E protection diagram (2fH versions)


AUDIO POWER AMPLIFIER [A]
Supply (FFS) [A]
+28S
STBY
High=STBY
+25
+5V [C]
+5V2
PORT
+VT (Tuner)
+5D
+8S
ON-LED
MAINS SWITCH
MAINS IN
Mains Filter [B]
RC5-rec.
STAND-BY PROCESSOR IC7600 [K]
PORT
+5STANDBY (33mA max)
STAND-BY LED:
- FLASHING SLOW (1.25Hz):
> NO COMM. WITH MAIN PROCESSOR: +5V PROTECTION
- FLASHING FAST (5Hz):
> OTHER PROTECTION
+5V PROTECTION:
TEST 3X DURING 3X 700MS IF MAIN IS ALIVE
+8V PROTECTION
ERROR 15, TDA9141 [K]
ERROR 16, TDA4780 [K]
ERROR 81, TEA6415c [K]
I²C BUS ERROR
ERROR 51, I ²C BUS BLOCKED [K]
MAIN-IS-ALIVE
I²C+ STROBE
SLOW DOWN
FAST DOWN
>=1
SERIES SWITCH
TS7470
+V0S (140 V)
HORIZONTAL DEFLECTION STAGE [A]
EHT
+200V
FILAMENT
SCAVEM SUPPLY
+13D
EHT Flash detection
EHT info
+13V-LOT
-15V-LOT
VERTICAL DEFLECTION STAGE [A]
TS7392
Flash protection
EW-PROT
D6365
+8V Protection?
Y
PROTEC TION ACTIVE
IR-LED (SERVICE)
+ error 45
+ error 48
+ error 44
Y
Error buffer
> 1000ms ? *)
+5V2
PORP
MAIN PROCESSOR IC7200 [J]
EW Drive
HDrive
HFB (Horizontal Fly Back)
EHT info
D6334
Only active during series switch test at start up!
PROT
D6320
DDP-prot
DDP (IC7315) (DIGITAL DEFLECTION PROCESSOR) [D]
VDRIVE
VFB (Vertical Fly Back)
Important LSP Errors
Error 18, no DDP acknowledge [D]
Error 69, DDP: HFAIL, bad or missing HFB [D, A]
Error 70, DDP: VFAIL, bad or missing VFB [D, A]
Error 71, DDP: Beamcurrent too high [D, A, E]
Error 47,   Start-up error of horizontal output stage or series switch defective [D, A]
*) TESTED 5X DURING 5X200MS, BUT THIS CAN BE LONGER IN CASE OF MISSING FRAME PULSES (VFAIL, ERROR 70)
PROT.EPS 9609

Error code table

Error	Device	Description	Item	Panel	Defective module indication in SAM	MD2.1	MD2.2
0	no error		-	-	No errors	x	x
4	ST24C16B1	NVM EAROM 2048 bytes	7201	SSP	Control	K	K
6	UV916S	Tuner	1100	SSP	Tuner	K	K
15	TDA914X	Video + sync processor	7352	SSP	Video processing (SSP)	K	K
16	TDA4780	Video controller	7500	SSP	Video control	K	K
18	TDA9155	DDP processor	7315	DDP (Geometry)	Geomtry processor	D	D
28	SAA5270	TXT processor	7400	TXT	Teletext	J	J
29	PCF83CE652_ featurebox	FBX microprocessor	7505	FBX	Feature box	M	M
33	SDA9288_2_pip2	PIP-processor	7788	PIP	PIP	S	S
34	UV12xx	PIP or DW tuner	1775 / E9F1	PIP / DW	PIP / Video DualScreen	S	S / AC
36	PCF8574_pip	I/O-expander for PIP forced colour	7860	PIP	PIP	S	S
37	SAB9077H_dwi	PIPO (Picture In Picture Out)	IC9A	Video DualScreen	Video DualScreen	-	AC
38	PCF8574_dwi	I/O-expander for DW	IC9N	Video DualScreen	Video DualScreen	-	AC
39	TDA914x_dwi	Video + Sync processor for DW	IC9J	Video DualScreen	Video DualScreen	-	AC
44	SW_protection (uP has decided for protection)	Generated after error code 51, 18, 69, 70 or 71	-	-	SW Protection	x	x
45	Supply_8V	TDA4780 + TDA914x + TEA6415 (+ TDA9860)	-	-	+8V Supply error	K	K
47	+140Vserie_switch_ protection	Series switch protection (only checked at start up)	-	LSP	Series switch 140V	A	A
48	Protection (prot-line)	Hardware protection (activated by the PROT-line)	-	LSP + DDP	HW protection	A+D	A+D
51	I2c_slow_bus	Blocked I2c slow-bus (shorted SDA, SCL or SDA to SCL)	-	-	I2C bus blocked	x	x
58	TDA9860_vds	Sound processor on Dolby Audio Module for Video DualScreen	7590	Dolby Audio Module	Audio module	-	P
64	TDA9177_LTP	Line Transient Processor	7580	SSP	Video control / picture signal imrpov.	-	K
69	Protection_hfail	Horizontal deflection error (DDP protection)	-	DDP + LSP	Horizontal circuit	D	D
70	Protection_vfail	Vertical deflection error (DDP protection)	-	DDP + LSP	Vertical circuit	D	D
71	Protection_overcurrent	Overcurrent protection (DDP protection); beam current too high	-	DDP + LSP	Beam current	D	D
79	TDA9860_DW	Sound processor for DW	-	-	-	-	AC
80	MSP3400/3410	FM/NICAM decoder and audio source select	7353	Audio module	Audio module	O/P	O/P
81	TEA6415	Source select video matrix	7406	SSP	Source select	K	K
82	TMP47C640/840	Standby(I/O)-processor	7600	SSP	Standby processor	K	K
85	SAA7710T	Dolby processor	7600	Dolby audio	Audio module	O/P	O/P
86	PCF8574A	I/O-expander for frame rotation	7050	N/S + ROT	Rotation panel	F2	F2
88	TSA5520	Wireless dolby	1403	Wireless dolby trans	Dolbt transmitter	-	AE1

Service modes, DST, Error messages,

In this chapter the following paragraphs are included:

6.1 Test points
6.2 Service modes and Dealer Service Tool
6.3 Error codes
6.4 Protections
6.5 Faultfinding and repair tips

6.1 Test points

The MD2 chassis is equipped with test points in the service printing. These test points are referring to the functional blocks:

★ P1-P2-P3, etc:	Test points for the power supply
★ L1-L2-L3, etc:	Test points for the line drive and line output circuitry
★ F1-F2-F3, etc:	Test points for the frame drive and frame output circuitry
★ S1-S2-S3, etc:	Test points for the synchronisation circuitry
★ V1-V2-V3, etc:	Test points for the video processing circuitry
★ I1-I2-I3, etc:	Test points for the IF part
★ A1-A2-A3, etc:	Test points for the audio processing circuitry
★ C1-C2-C3, etc:	Test points for the control circuitry
★ T1-T2-T3, etc:	Test points for the teletext processing circuitry

The numbering is done in a for diagnostics logical sequence; always start diagnosing within a functional block in the sequence of the relevant test points for that functional block.

6.2 Service modes and Dealer Service Tool (DST)

Together with the GFL chassis a dealer remote control is introduced, the RC7150 which is called the Dealer Service Tool or DST. This RC7150 is a remote control for the dealer and the servicer and is fully compatible with the MD2.

6.2.1 Installation features for the dealer

The dealer can use this remote control for programming the TV-set with presets, TV-settings, Dish settings and Logo's. Just like the GFL, the MD2 and a lot of existing sets like MD1, AA5, FL, GR2, G90B, G110 and the new Philips VCR series using the so called NORA deck can be programmed with it.

One of the innovative features of the Dealer Service Tool is the way in which it is programmed. A complete list of presets can simply be downloaded from the MD2 (and GFL) into the Dealer Service Tool.
To make this download possible, a two way communication link, the so called 'dealer link', is set up between the RC7150 and the MD2 TV-set. To establish this link, the MD2 sets are equipped with an additional Infra Red transmitter LED and the RC7150 has an Infra Red receiver on board. The Dealer Link however only works on short distance, up to 10 cm or 4 inches.
For explanation of the installation features of the DST, the directions for use of the DST are recommended (use code 4 for correct downloading).

The figures below show the position of the DST for the different types of styling:

Styling with top centre operation:

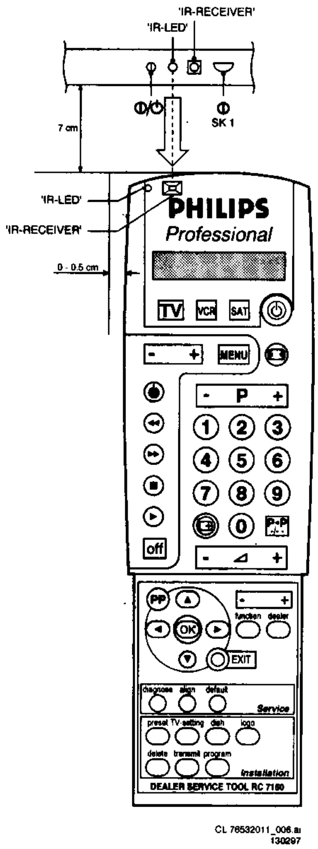

'IR-RECEIVER'
'IR-LED'
7 cm
SK 1
'IR-LED'
'IR-RECEIVER'
0 - 0.5 cm
PHILIPS
Professional
TV
VCR
SAT
MENU
P
off
OK
EXIT
function
dealer
diagnose
align
default
Service
preset
TV-setting
dish
logo
delete
transmit
program
Installation
DEALER SERVICE TOOL RC 7150
CL 76532011_006.ai
130297

Fig. 6.1

Styling with top right operation:

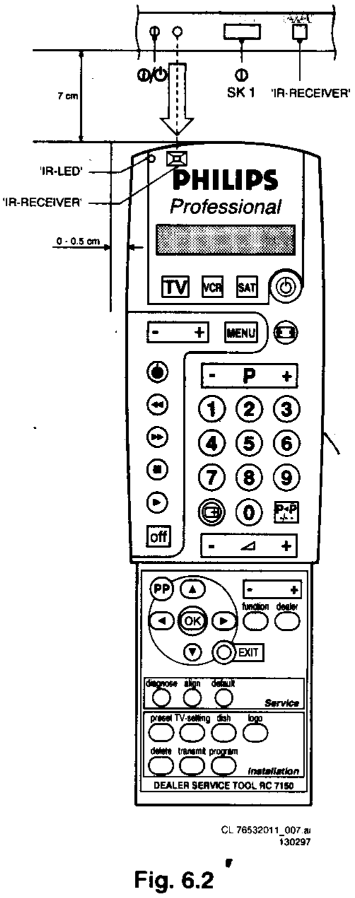

7 cm
SK 1
'IR-RECEIVER'
'IR-LED'
'IR-RECEIVER'
0 - 0.5 cm
PHILIPS
Professional
TV
VCR
SAT
MENU
P
off
OK
EXIT
function
dealer
diagnose
align
default
Service
preset
TV-setting
dish
logo
delete
transmit
program
Installation
DEALER SERVICE TOOL RC 7150
CL 76532011_007.ai
130297

Fig. 6.2

Protections, Faultfinding and Repair tips

Styling with front operation:

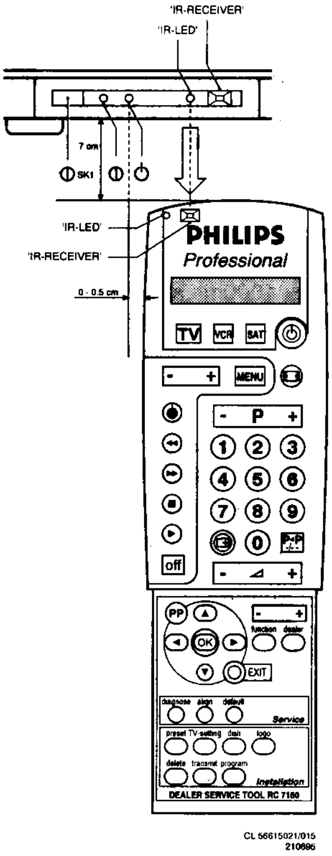


Fig. 6.3

Dealer Mode
Press the 'DEALER' key on the DST to enter the Dealer Mode. In the dealer mode some settings can be changed in order to customize the set.

6.2.2 *Diagnose features for the servicer*

The MD2 sets can be put in the various service modes via the DST RC7150. The Service Alignment Mode and the Service Default Mode can also be entered by connecting the pins on the SSP.

Service Default Mode (SDM)
Specification of the SDM:

- Tuning frequency 475.25 MHz;
- TV-system for BGLM set to BG, for BGLL'I sets to LL';
- All picture settings at 50% (brightness, colour, contrast, HUE);
- All sound settings at 50% except volume at 25% (so bass, treble, balance at 50%, volume at 25%);
- All service-unfriendly modes are disabled (like sleep timer, child lock, automatic switch off, blue mute).

Entering the SDM can be done in 2 ways:

- By the 'DEFAULT' key on the DST while the set is in the normal operation mode.
- By shortcircuiting the two pins on the component side of the SSP with the indication 'SERVICE DEFAULT MODE' (activation can be performed in all modes except when the set has a problem with the main-processor (indicated by a slow (1.25Hz) blanking LED)).

Note: If the SDM is entered via the pins, the Series Switch protection (error 47) and the +8V protection (error 45) is de-activated.

Exiting the SDM can only be done via the STANDBY command. By switching off-on the set with the mains switch the MD2 will come up again in the SDM.

Service Alignment Mode (SAM)
Specification of the SAM:

- Software alignments (see chapter 8);
- Option settings (see chapter 8);
- Error buffer reading and erasing. The most recent error code is displayed on the left side;
- Operation counter;
- Software version.

Entering the SAM can be done in 2 ways:

- By the 'ALIGN' key on the DST while the set is in the normal operation mode (or SDM). Enter the password '3-1-4-0' and press OK.
- By shortcircuiting the two pins on the component side of the SSP with the indication 'SERVICE ALIGNMENT MODE' (activation can be performed in all modes except when the set has a problem with the main-processor (indicated by a slow (1.25Hz) blanking LED)).

  Note: If the SAM is entered via the pins, the Series Switch protection (error 47) and the +8V protection (error 45) is de-activated.

Exiting the SAM can be done via the MENU command or via switching off-on the set with the mains switch.

Customer Service Mode (CSM)
In order to be able to deal with 'house repairs' and ' nuisance calls' better in the future, the so-called 'Customer Service Mode' will introduced in all future chassis relevant for this. This 'Customer Service Mode' (CSM) is a special service mode which can be activated and deactivated by the customer. This CSM is a 'read only' mode, therefore the customer is unable to write into this.

The customer activates the CSM by pressing and holding the 'MUTE' button on the remote control for at least 4 seconds at the same time as pressing the MENU button on the TV. This activation only works if there is no menu on the screen.

The customer deactivates the CSM by:

- selecting any button on the remote control;
- switching the set off (mains switch) and then switching back on again.

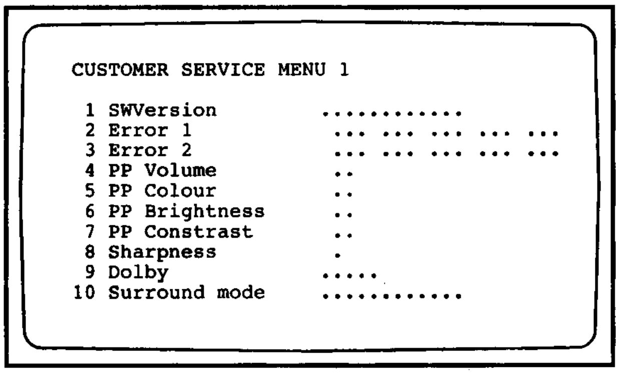
The following settings are displayed in the CSM:

- Software version.
- Error code buffer.
- Overall setting of the PP (Personal Preference) values for volume, colour, brightness, contrast (all 0-63) and focus (0-4).
- Dolby Signalling detection indication: 'Present' or 'Not Present'.
- Attention: the presence of Dolby can only be tested by the software on the Dolby Signalling Bit. If a Dolby transmission is therefore received without a Dolby Signalling Bit, then this indicator will show 'not present' even though such a Dolby transmission is received.

- Overall setting of the Surround Mode: 'Pro Logic' or 'Dolby 3 Stereo' or 'Hall' or 'Off'.
- Overall setting of the Rear Volume (0-63); volume of the surround sound speakers in 'Pro Logic' or 'Dolby 3 Stereo' or 'Hall' mode.
- Overall setting of the Centre Volume (0-63); volume of the centre speakers in 'Pro Logic' or 'Dolby 3 Stereo' mode.
- Local setting of the DNR and a value for the noise number (good signal 0-2, average signal 4-5, bad signal 7 or higher).
- Overall setting of the Digital Option ('100 Hz', 'Digital Scan' or 'Natural motion').
- Local setting / detection of TV and Audio system information: 'NICAM'/'MONO'/'A2' (analogue stereo sound) /'DUAL' and 'PAL'/'SECAM'/'NTSC'.
- Detuned bit is 'Yes' or 'No';
  This bit indicates whether the selected programme is stored after a micro-search or not: for 'Yes' the programme is stored via manual entry of the frequency when a transmitter was not present on that frequency. In that case the TV will attempt to perform a micro-search every time the programme number is selected. Once the micro-search has been successful the Detuned Bit will be set to 'No'.
- Overall setting of the configuration menu for 'VCR type' is 'PALplus' or 'Non PALplus';
  If PALplus VCR type is selected the luminance and chrominance on the PALplus panel is decoded for the VCR signal. If this configuration is set incorrectly this will result is stripes on the picture.
- Overall setting in the configuration menu for 'CD-i/Photo-CD' is 'Present' or 'Not Present';
  If 'Present' is selected the starting point is a top quality signal and a number of settings are therefore changed automatically. If this configuration is set incorrectly this will result in a worse picture quality.

All settings are displayed in 'real time'. The settings displayed are therefore the settings which were set at the moment of activating the CSM. The 'overall' settings apply for all programmes, the 'local' settings are only for that programme viewed that was selected at the moment at which the CSM was activated.

The screen appears as follows:



```
CUSTOMER SERVICE MENU 1

 1 SWVersion         ............
 2 Error 1            ... ... ... ... ...
 3 Error 2            ... ... ... ... ...
 4 PP Volume         ..
 5 PP Colour         ..
 6 PP Brightness     ..
 7 PP Constrast      ..
 8 Sharpness         .
 9 Dolby             .....
10 Surround mode     ............
```

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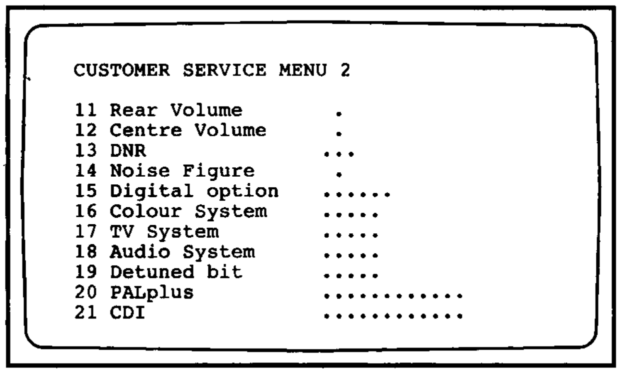
Fig. 6.4a



```
CUSTOMER SERVICE MENU 2

11 Rear Volume       .
12 Centre Volume     .
13 DNR               ...
14 Noise Figure      .
15 Digital option    ......
16 Colour System     .....
17 TV System         .....
18 Audio System      .....
19 Detuned bit       .....
20 PALplus           ............
21 CDI               ............
```

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Fig. 6.4b

Diagnose Mode (only active during transmission of error codes and diagnose 99)
This mode is activated by the DIAGNOSE command on the DST for reading the error codes and erasing the error buffer by the DST even when the set is in protection and so there is no picture (assuming that the power supply and the control part are working). For activation see paragraph 6.3. The diagnose Mode is only a temporarily mode (the set will go back to the previous mode), and can not be switched on permanently.

Note: The diagnose mode can not be entered if the SAM is activated.

6.3 Error codes

6.3.1 Reading error codes from the error buffer

The error buffer can be read in 2 ways:

1. On the screen via the Service Alignment Mode (SAM):
   In case picture is OK, the error buffer can be read the easiest via the SAM. In the main menu of the SAM the last 10 different error codes occurred are displayed. The most recent detected error code is displayed on the left side, so e.g.:

0 0 0 0 0	means no error codes present in the buffer
3 0 0 0 0	means one error code present in the buffer; error code 3
2 3 0 0 0	means two error codes present in the buffer; error code 2 is the most recent, error code 3 is detected before 2.

2. On the display of the DST:
   If an error has been detected by the MD2 chassis, the set might go into protection. Without the presence of a picture the errors can be read by the DST, as long as the main-processor is still active (green LED continuous and red LED blinking fast (5Hz); in case of red LED is blinking slow (1,25Hz) there is a main-processor problem).

To transmit the errors from the TV to the DST:

1. Press the 'DIAGNOSE' key (in all modes except the SAM);
2. Press '1' to view the last error detected;
3. Hold the DST 5 to 10 cm from in front of the stand-by LED of the set (the IR-sending LED of MD2 is located near the stand-by LED);
4. Press the 'OK' key.

The error is represented by a 2 digit number.
The 2 digits on the DST are displayed sequentially, with a pause before it is repeated. The digit after the pause is the 1st digit.
If the display reads 4 - 7, the error code is 47. To read other error codes, press 'DIAGNOSE' and one of the other digit keys.

Note:

- If the DST cannot communicate to the MD2 in a proper way, ERROR 2 is shown in the display of the DST. Trying again by changing the DST position a little bit might often help.
- If the error buffer of MD2 is empty, no errors are displayed by the DST; the display remains blank.

6.3.2 *Clearing the error buffer*

The error buffer can be cleared in 2 ways:

1. In the SAM by selecting the item RESET ERROR BUFFER in the main menu.
2. By the 'DIAGNOSE 99' command of the DST (in all modes except the SAM). Press the DIAGNOSE key on the DST, followed by 9 and 9 and then <OK>.

6.3.3 *Error code table*

See page 8.

Remark: If on the DST the text 'ERROR 2' is displayed, this means that the communication from the TV to the DST has failed.

6.4 Protections

6.4.1 *Protection-structure*

The MD2 'Protection Diagram' shows the structure of the protection system. See protection diagram on page 8.

Two micro-processors
The MD2 chassis has two micro-processors. The microprocessor on the SSP is the so called I/O- or standby-processor and also remains active in standby. The supply of the standby(I/O)-processor comes from the main supply, both in normal operation as in standby. The standby (I/O)-processor controls the standby-LED, controls the STANDBY line for switching on and off the main supply and the SLOW DOWN line for switching off the supply of the line-deflection-circuitry. In the diagnose mode the standby (I/O)-processor feeds through the RC5-communication to the main-processor.

The communication between both processors happens via I^2C. An additional STROBE-line takes care for addressing of the standby(I/O)-processor as the standby(I/O)-processor does not have a defined I^2C address.
Whether the main-processor is OK, is checked by the MAIN-IS-ALIVE-line. This line also gives an indication whether the +5V2 voltage is present. Via this line also transfer of error codes takes place to prevent that a blocked I^2C bus could avoid this transfer.

The communication between the diagnose-information of the Dealer Service Tool (diagnose mode) goes via an IR service LED which is connected to the main-processor. This means that in case of protection the power supply and the main-processor must be switched out their standby mode in order to transfer diagnose-information. After calling the error codes from the error buffer (via the DST), the standby(I/O)-processor shortly starts up the main-supply and the main-processor, after which the main-processor sends the codes to the IR service LED. After the transfer the main-processor and the power supply return to their previous mode (in case of protection the power supply will return to standby mode and the main-processor will be switched off again).

Different protection-levels
Via the Series Switch TS7470 the supply of the line-deflection stage can be switched off and on. Normally (during start-up and switch off) the Series Switch TS7470 is controlled by the SLOW DOWN signal from the standby (I/O)-processor, but in case of an Urgent Alarm the FAST DOWN switches off the line-deflection stage directly. An Urgent Alarm is given to the main-processor via the PROT-line and an inverter. The PROT-line is high in case it is active (low at the input pin 62 of the main-processor).

The protection-system of the chassis has three different levels:

- False Alarm
  During a short time something is wrong, but further action is not required. Examples are: short absence of frame-synchronisation-pulses for example after a program-switch.

- Real Alarm
  In case something is wrong, but immediate action is not required. The processing takes place by the both microprocessors and can take a few seconds.
  The standby(I/O)-processor switches of the line-deflection stage by - via the SLOW DOWN line - opening the Series Switch TS7470. After that via the STANDBY line the supply is switched off.

- Urgent alarm
  A problem is observed upon which immediate switching off of the line-deflection circuitry is required. Via the FAST DOWN line the Series Switch TS7470 is opened. In case the protection-situation remains present after 5 x testing (after 200ms, 400ms, 600ms, 800ms and 1000ms), in that case the main-processor takes over the processing as a 'Real Alarm'; the main-processor places information in the error code buffer and the standby(I/O)-processor switches off the power supply.

An 'Urgent Alarm' can be activated by the East-West protection-circuitry or by an short peak in the beam-current (for example after a picture tube discharge (flash)).

6.4.2 Protection via the DDP (IC7315 on the DDP panel)

The protection output of the DDP is connected to the PROT-line via D6320. Only in case this protection is still active after 5 x testing (every 200ms), the main-processor orders the standby(I/O)-processor to switch off the line-deflection-circuitry (via the SLOW DOWN) and the power supply via the STANDBY command.

Just before switching off, the status register of the DDP is read out and the corresponding error is placed in the error code buffer together with error 48 (Protection). To indicate the protection-situation the stand-by LED starts blinking fast. Via the DST the error buffer can be read.

In case the DDP makes the PROT-line high, the status register of the DDP contains information concerning the reason of the protection. After the main-processor has read the status register via I²C, the PROT-line will be reset and the status register erased. In case the error repeats, the PROT-line becomes high again and the status register is filled again.

The DDP can detect 3 errors:

- Horizontal Failure: HFB pulses do not have the right shape or are not present (error 69).
- Vertical Failure: VFB pulses do not have the right shape or are not present (error 70).
- EHT overcurrent: Too high beam current (EHT-info) (error 71).

If the DDP does not communicate any more with the main-processor, the main-processor places error 18 in the error buffer.

Remark: During the start up the DDP can not check the HFB and VFB. To check the behaviour of the HFB pulses during the start up anyhow, the circuitry around Opamp IC7360 is present (see start up protections).

6.4.3 Start up protections (Series Switch test)

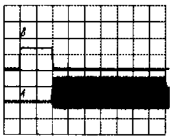
During start up of the set, the Series Switch TS7470 is tested by Opamp IC7360 on the DDP panel. If the Series Switch TS7470 does not function well, error 47 is generated.

The start up procedure is normally processed as follows:

1. Startup of supply voltages (so also +5V and +8V of the DDP)
   → The PROT line becomes high (active) via opamp IC7360 on the DDP panel (output pin 1 of the Opamp IC7360 becomes high in case no HFB pulses are present; this output is coupled to the PROT-line via diode D6334).
2. Approx 800ms after the supply voltages are present, the DDP starts up (HDRIVE) and tries to start the line-circuitry.
   → The DDP measures the presence of the HFB pulses; these pulses should be absent as the Series Switch is still open.
   → Only in case the HFB remains absent, the PROT-line remains high (active).
3. Only in case the PROT-line is still high approx 200ms after starting up the HDRIVE, the software will close the Series Switch TS7470 (so in a correct situation approx 1000ms after the supply voltages are present the Series Switch is closed)
   → The HFB pulses should be present now (so indeed the Series Switch has closed)
4. Only in case the HFB is present (line is OK and Series Switch is indeed closed), the PROT-line becomes low as both the DDP and Opamp IC7360 are receiving HFB pulses.
5. Everything is OK.

Correct situation

B = 5V/div PROT line at 7L11
A = 10V/div (35Vtt) HFB at test point L4
time base = 0.5S/div



In practice:

- In case the Series Switch is closed continuously (so defective), flyback pulses are already present at point 2. As a result the PROT-line already becomes low at point 2 (already 800ms after the supply voltages are present). The main-processor will order the standby(I/O)-processor to switch the power supply to stand-by and places error 47 in the error buffer.
- In case the HFB pulses remain absent after closing the Series Switch TS7470, the PROT-line remains high (points 3). The line circuitry does apparently not start up (well) or the Series Switch does not close. The standby(I/O)-processor will switch the power supply in stand-by after all. Also in this case error 47 is placed in the buffer.

  Attention: Above mentioned means that error 47 is generated in case the line-deflection circuitry can not be start up well. So in case there are problems in the line deflection part during start up, always error 47 will be in the error buffer. Extra errors in the error buffer like error 48 (protection) and error 69 (horizontal failure) indicate that the defect popped up during normal operation.
  After the next first attempt to start up, this will fail and error 47 is added to the buffer. As a result, an error 47 in the error buffer will mostly not be caused by a defective Series Switch TS7470, but has another cause in the line deflection part.

6.4.4 *East-West protection (EW_PROT)*

The East/West protection switches off the Series Switch TS7470 directly via the FAST DOWN signal and diode D6365 on the DDP panel. Because of the FAST DOWN, the Series Switch TS7470 is switched open, no HFB any more and so via the DDP and IC7360 the PROT-line will also become active and so the main-processor can take over the protection-processing. The East/West protection detects a too high current through the East/West power output stage around TS7480.

Note: **A too high current through the East/West stage can be caused by a defective part in the line-deflection circuitry!!!**

The current through the East/West stage is measured on the LSP via 2 precision resistors (R3483 and R3484). In case an error occurs in the line output stage the voltage across these resistors rises. This voltage is fed to the + input pin 5 of Opamp IC7360 on the DDP panel. The - input is connected to a DC-level of approximately 1V1. In case the voltage on the + input of IC7360 (EW_PROT line) becomes higher than 1V1, the output (pin 7) of IC7360 becomes high. The FAST DOWN also becomes high via D6365 and switches off the supply of the line output stage immediately via the Series Switch.
The FAST DOWN is kept high (via D6362) until the power supply is switched into standby (protection) as follows; as the Series Switch is open, no HFB is present any more and so the PROT becomes high by the DDP (error 47 or 48 and 69); after ≥ 1000ms PROT-line high, the protection procedure is started.

As East/west protection does not have a separate error code. Activation of a protection caused by the EW_PROT line can be measured by pin 7 of IC7360 on the DDP. If this pin becomes around 8V for a few seconds, in that case the protection is caused by an activated EW_PROT line.

The East/West protection becomes active in the following cases:

1. Bad contacts in the horizontal deflection circuit:
   - Horizontal deflection coil
   - Linearity corrector coil L5421
   - S-correction capacitor C2432
2. Bad contacts in the flyback capacitor C2425 or C2428
3. Shorted flyback diode D6421.
4. Shortcircuit in E/W transformer (secondary side of T5424 or T5422 (one of the two transformers is present).
5. Shortcircuit in secondary windings of LOT.
6. Shorted S-correction capacitor C2432.
7. Bad solder contacts in the line output stage.
   In case the East/West protection became active, by then the line transistor 7421 can also be defective.

6.4.5 *Software protection*

The software protection is totally managed by the two micro-processors and consists out of a continuous checking on the presence of the +5V2 and the +8V supply voltage and the continuous checking on the activity on the I²C bus.
This checking is done by testing the communication between the two micro-processors and a number of IC's which are connected to this supply voltage. In case one of these IC's do not respond, the protectionprocessing becomes active and the power supply will be switched to stand-by.

+5V2 protection of the standby(I/O)-processor
Via the MAIN-IS-ALIVE line the standby(I/O)-processor checks the presence of the main-processor every 700ms, and after that also the presence of the +5V2 supply voltage.
In case the communication with the mainprocessor fails 3 times after each other, by then the standby(I/O)-processor switches the power supply to standby(I/O) and will blink the standby-LED slowly (1.25Hz). In this case no error code can be written to the error buffer as this is done by the main-processor which does not respond.

+8V protection via the main-processor
The main-processor controls via a number of IC's the presence of the +8V supply voltage on the SSP. This controls is realised via I²C. The following IC's are used for the check of the +8V supply voltage:

- Videocontroller, TDA4780, (error 16)
- Videoprocessor, synchronisation, TDA9141, (error 15)
- Source select, TEA6415C, (error 81)

In case one of the above mentioned IC's does not respond, the error code of that specific IC is stored in the error buffer together with error 45 (+8V error) and the main-processor gives an order to the standby(I/O)-processor to switch the power supply to stand-by.

I²C protection (error 51)
The (slow) I²C bus is controlled at each I²C-command. To do this at every I²C command a defined start/stop condition is generated. In case this defined start/stop condition fails for a few times after each other, by then error 51 (I²C error) is placed in the error buffer and the power supply is switched to stand-by.
In case of I²C protection, the standby(I/O)-processor still can communicate to the main-processor for diagnose mode (reading error codes in the buffer and displaying via the Service LED) by communication via the STROBE line.
I²C-protection is generated in case the SDA is shorted to earth, in case the SCL is shorted to earth or in case the SDA and the SCL are shorted.

Remark: The (fast) I²C bus for teletext and the I²C bus to the EAROM are not checked for protection matters. By the way, both busses are only present on the TXT+control panel (panel with the main-processor).

Flash protection

A special protection is the EHT-info protection. After a 'flash' in the picture tube (a peak current as a result of an internal discharge) this protection switches off the line output stage by the FAST DOWN signal. On the DDP panel the circuitry around TS7390, 7391 en 7392 detects a fast dip in the EHT-info-line. The voltage at this line becomes negative at the moment of a flash. Via the previous called transistors the FAST DOWN line becomes high and so the supply of the line output stage switches off before an increased current can damage the line-deflection circuitry.

As a 'flash' only has a temporary character, the line output stage will start up immediately again. The error is very short and will be denied by the main-processor (false alarm). Within less than 0,5 a second the line circuitry will start up again.

6.4.6 *Rest of the protection diagram*

The voltages generated by the LOT

The line output stage generates different secondary voltages:
- +13VLOT to the picture tube panel (pin 8 of the LOT);
- -15VLOT to the DDP and the picture tube panel (pin 9 of the LOT);
- The filament (heating) of the picture tube (pins 11 and 12);
- The +200V for the RGB output stages (pin 7);
- The supply of the DC shift circuitry (pins 4 and 7);
- The EHT is generated by a diode split. The focus and the VG2 voltage are derived from the EHT. The focus and VG2 potentiometers are integrated in the line output transformer (LOT).

The beam current flows from the 141V through R3450 and 3451. In case of an increasing beam current, the voltage at pin 10 of the LOT and so the voltage across C2450 will decrease.

6.5 Faultfinding and repair tips

See faultfinding trees on page 8.

6.5.1 *General*

1. With most defects the MD2 will give no picture and no sound; the set is in protection (power supply switched to standby, so the entire set is down except the standby(I/O)-processor.
2. **LED indication after start-up procedure is completed (see fault finding tree):**
   - No LED's
     Supply or microprocessor problem.
   - Both LED's continuously
     Control part or standby mode defective.
   - Red LED blinking slow (1.25Hz)
     Protection mode (main proces sor or +5V2).
   - Red LED continuously
     Control part, RC or RC5 defective.
   - Red LED blinking fast (5Hz)
     Protection mode (all other errors).
   - Green LED continuously
     Supply and micro-processors are OK.

   Switch on the set via the mains-switch.
   If the LED's behave properly it is likely that the microprocessor is OK.
   The green LED shows that the power supply has started up. If, after a few seconds, the stand-by LED is blinking an error is detected. Now the supply is switched to stand-by position again. Restart is only possible via the mains-switch or the internal service pins.
3. Audible checks:
   - Do you hear demagnetisation? Yes, mains voltage is present at mains input panel.
   - Do you hear EHT? Yes, supply is OK (DDP and line output stage only works in case VOS (141V) is OK).
   - Power supply is hiccuping? Power supply is shorted. Check the LOT, Series Switch TS7470, line transistor TS7421.
4. Error codes
   In case error 48 is displayed, the protection circuit was active and initiated by the PROT-line. Reading the next error code can give other information about the defect.
   If, for example, the second error is 69 H-FAIL (detected by the DDP because the HFB pulses do not have a correct shape) we know that the line circuit is not working properly.
   Error 18 indicates that the DDP does not communicate to the main-processor. Most likely the power supply is not working or short circuited.

   Some important error buffer possibilities:

44 47	Line error occurred at/before start up
44 48 69	Line error occurred during normal operation
47 44 48 69	Line error occurred during normal operation and after that a try for start up again was performed.

   Line errors can be:
   - ★ Series switch test (this error can only be generated at start up)
   - ★ East/west protection (EW_PROT)
   - ★ HFB fail

   See paragraph 6.5.3 for a faultfinding method within the line output stage.

44 48 70	Frame error (error can occur at/before start up or in normal operation)
44 48 71	EHT-INFO problem, so eg +200D not present or one of the RGB amplifiers is shorted (error can occur at/before start up or in normal operation)
44 (45) 51 82	I^2C bus shorted, or SCL is shorted or SDA is shorted. In case of such I^2C-problems, the error buffer always shows 44 51 82 after erasing the error buffer and then start up again.
5. Overrule start up protection (error 47) and +8V protection (error 45)
   While the set is in the protection mode (power supply in standby), start the SDM or SAM via the service pins at the component side of the SSP.
6. Microprocessor problems
   In case of microprocessor problems, via the shape of the MAIN_IS_ALIVE it can be determined whether the main-processor, the standby(I/O)-processor or the +5V2 has caused the problem. The MAIN_IS_ALIVE must be measured at pin 36 of the standby(I/O)-processor.

Protections, Faultfinding and Repair tips

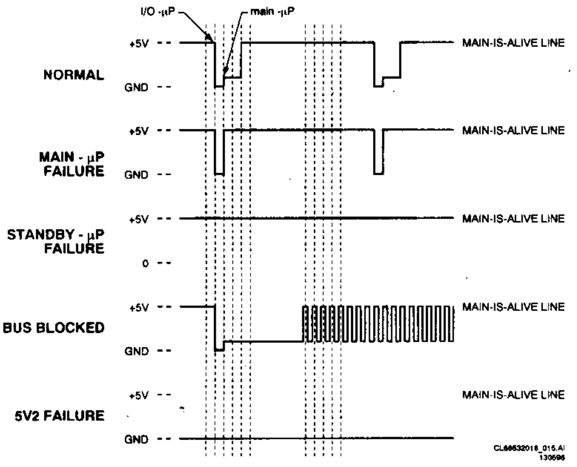


Fig. 6.5

So:

- a Pulses without 0V3 steps
  → main-processor failure
- b Always 5V2, so no pulses at all
  → standby(I/O)-processor failure
- c Always 0V, so no pulses at all
  → +5V2 not present

7. Dolby
   In dolby sets, both the clickfit and the surround sound panel can be bypassed (taken out) by connecting the speaker plug in L38 in stead of U36.

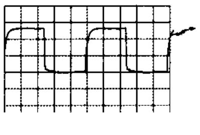
6.5.2 *Fault finding in the power supply*

In case of a power supply problem, the power supply can be simplified to a stand alone power supply at low voltages (low risk) as follows:

Control part of the power supply

1. Disconnect the SSP (as a result the line will not function any more, so will not be a load of the power supply any more) or disconnect the line by jumper 9471 on the LSP.
2. Connect an external DC power supply between supply pin 1 IC7520 (via a diode - eg BYD33D - with cathode to supply pin 1 IC7520) and hot earth (e.g earth of the big smoothing capacitor C2505)
3. Connect a oscilloscope to test point P5 at pin 3 IC7520.
4. Turn up the external DC supply voltage slowly to 17V DC.
   Remark: The IC starts at a supply voltage of approx 14V DC, after that the supply voltage can drop to approx 9V DC.
   At approx 18V DC, overvoltage protection becomes active, by then the supply voltage should first drop below 7V DC before a new start-up is performed by turning up the supply voltage above 14V DC.
5. In the correct situation the oscillogram should be as displayed below. If not the power supply control part (IC7520 or periphery at pins 9, 10 or 11) is defective.

A = 5V/div
time base = 5µS/div
→ 40kHz pulse



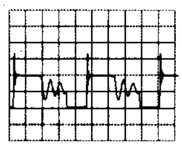
Energy transfer of the power supply (only if control part is OK)

6. Apply action 1, 2 and 4 (if not already done)
7. Connect a lamp of 220V 100W across the VOS output capacitor C2569.
8. Connect a 1k resistor between the +8S (connector 4L10) and the STANDBY line (between R3595 and R3596) to switch the power supply to normal operation.
9. Connect the mains to a VARIAC but leave it at 0
10. Connect a voltmeter across C2569 and a scope between the drain of TS7541 and hot earth.
11. Slowly increase the mains input voltage by the VARIAC (in this way further damage to the power supply can be avoided).
    The oscillograms for the following mains voltage are given:

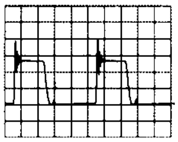
Mains in voltage

10V AC:	20kHz and VOS 7V5
20V AC:	40kHz and VOS 30V
40V AC:	40kHz and VOS 80V
65V AC:	40kHz and VOS 140V
>65V AC:	Stable situation, so 40kHz and 140V

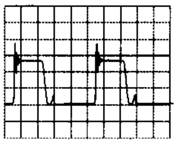
1. Mains in 10V AC
   A = 10V/div
   time base = 10µS/div
   → 20kHz pulse
   → VOS 7V5



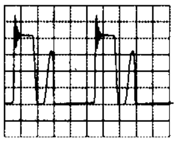
2. Mains in 20V AC
   A = 20V/div
   time base = 5µS/div
   → 40kHz pulse
   → VOS 30V



3. Mains in 40V AC
   A = 50V/div
   time base = 5µS/div
   → 40kHz pulse
   → VOS 80V



4. Mains in 65V AC
   A = 50V/div
   time base = 5µS/div
   → 40kHz pulse
   → VOS 140V



A more detailed fault finding tree for this power supply is given in the MD1 service manual and service informations. Note in this respect that the MD2 power supply is principally the same as the MD1 25-28" power supply (so not the same as the MD1 21" power supply).

6.5.3 *Fault finding in the line circuitry*

The HFB (test point L4 or between C2419 and C2420) together with PROT line (eg at connector 7L11) are very informative test points for possible line circuitry faults.
A good way of working is:

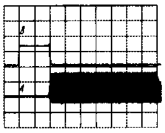
A. Check DDP (HDRIVE);
B. Check the HFB and the PROT lines in a normal set-up (220V mains and HDRIVE via DDP);
C. Second, in case the problem is in the line circuitry itself, the line circuitry can be simplified to a stand alone 'switched mode supply' at low voltages (low risk).

HFB and PROT measurements at start up in a normal set-up (220V mains and HDRIVE via DDP)

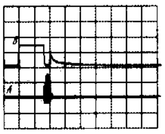
1. Connect a oscilloscope to the PROT signal (connector 7L11) and the HFB test point L4 (for a stable oscilloscope pattern, trigger the scope at the rising or falling edge of the PROT signal and apply a delay if needed).
2. In case of line problems normally the set is in protection. All test given below are done during the start-up phase, so the protection behaviour can be observed. After every new test, leave the set a few seconds enabling it to reset the protection.

Possibilities:

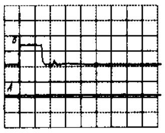
1. B = 5V/div PROT line at 7L11
A = 10V/div (35Vtt) HFB at test point L4
time base = 0.5S/div
So 1000ms PROT high (8V), then HFB continuously
→ **Correct situation**
See paragraph 6.4.3



2. B = 5V/div PROT line at 7L11
A = 10V/div (35Vtt) HFB at test point L4
time base = 0.5S/div
So 800ms PROT high (8V), then 200ms HFB
→ **Series Switch shorted**
Note: Amplitude OK (35Vtt), so line circuitry is OK. Directly after mains switch on after approx 800ms pulses appear for approx 200ms followed by protection.
See also paragraph 6.4.3; As the Series Switch is shorted, already after 800ms HFB pulses are present and the DDP will make the PROT line low. Because the PROT line is already low after 800ms, the set will switch into protection mode.

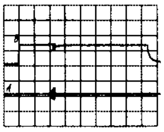


3. B = 5V/div PROT line at 7L11
A = 10V/div (35Vtt) HFB at test point L4
time base = 0.5S/div
So 4 seconds PROT high (8V) and no HFB
→ * **Series Switch open or**
* **line transistor open or**
* **no HDRIVE**
See also paragraph 6.4.3; After 1000ms the processors tries to close the Series Switch, but this is defective (open) and so there will be no HFB pulses measured at the DDP. In that case the software will wait for another 3000ms for HFB pulses. If this pulses will not be there even after this 3000ms, the set will switch into protection.

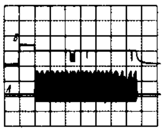


4. HFB and PROT both at zero during start up.
Power supply is shorted, so power supply hiccup and has no output voltage.
→ **Series switch and VOS (eg line transistor TS7421 or both diodes D6421 and 6422) shorted.**

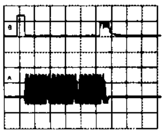
5. B = 5V/div PROT line at 7L11
A = 10V/div (35Vtt) HFB at test point L4
time base = 0.5S/div
So 4 seconds PROT high (8V) and shortly a HFB
→ * **Series switch, line transistor and HDRIVE are OK**
* **No line deflection (eg horizontal deflection coil not connected or open)**
See also paragraph 6.4.3; After 1000ms the Series Switch is closed, but the HFB is not correct. The small oscillation at 32kHz made 'somewhere in the line' indicates that the Series Switch, the line transistor and the HDRIVE are OK.



6. Two phenomema's:
a No picture, no sound; after approx 5 seconds very shortly a horizontal line and then the set switches into protection
b B = 5V/div PROT line at 7L11
A = 10V/div (35Vtt) HFB at test point L4
time base = **1S/div**
So in case of a horizontal line for a very short moment and in case for 1 second PROT high (8V) and no HFB and then for 7 seconds PROT high (5V) and HFB
→ **No frame deflection (eg frame deflection coil not connected)**
Start up procedure (1000ms PROT at 8V) is OK. After that the Series Switch is closed. In this case HFB pulses are normal present, but as the VFB pulses are not present (DDP generates error 70 V_FAIL) the PROT line becomes active driven by the DDP (for 7 seconds the PROT will be at 5V driven by the DDP).



7. Two phenomena's:
a Very bright picture with even whiter flyback lines. After approx 10 seconds set switches into protection
b B = 5V/div PROT line at 7L11
A = 10V/div (35Vtt) HFB at test point L4
time base = **2S/div**
So very bright picture with even brighter flyback lines and 1 second PROT high (8V), approx 8 seconds PROT low and HFB pulses and then 1 seconds PROT high (5V) with HFB
→ * **No +200D heater voltage**
* **RGB amplifiers shorted**
Start up procedure (1000ms PROT at 8V) is OK. Approx 8 seconds after this start up procedure, the DDP will make the PROT high (5V) because the EHT-INFO is too high (DDP will generate error 71 Overcurrent). After 1 second PROT high the set will go to protection.



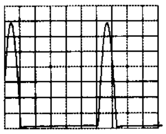
In case the line circuitry itself is defective

In case the line circuitry itself is defective, the line circuitry can be simplified to a stand alone 'switched mode supply' at low voltages (low risk) as follows:

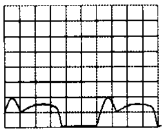
1. Take out the mains connector;
2. Disconnect the SSP;
3. Connect an external 50V DC (or 40V DC) supply with current measurement possibility between the source (output side) of the Series Switch TS7470 and ground;
4. Replace the DDP HDRIVE by an external LF generator (TTL level, so between 0 and 5V and duty cycle 50%) with a 32kHz pulse at cathode of D6409 (near LOT at the side of the PCB);
5. Connect a oscilloscope to test point L1 (collector of line transistor TS7421).

Possibilities:

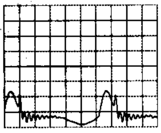
1. A = 50V/div test point L1 at collector line transistor
   time base = 5µS/div
   Current from external DC supply approx 100mA
   So normal 32kHz pulses and 100mA supply current
   → **Correct line circuitry**
   Amplitude of the signal is strongly depending on the frequency of the generator



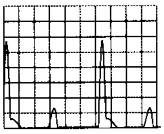
2. A = 50V/div test point L1 at collector line transistor
   time base = 5µS/div
   Current from external DC supply approx 100mA
   So lower pulses followed by long pulses and 100mA supply current
   → **Line deflection open, so eg:**
   - **line deflection coil open**
   - **linearity coil L5421 open**
   - **S-correction C2432 open**



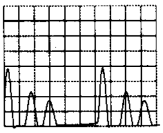
3. A = 50V/div test point L1 at collector line transistor
   time base = 5µS/div
   Current from external DC supply approx 500mA !!
   So fast oscillations and 500mA supply current
   → **Line deflection shorted (eg line deflection coil shorted)**
   In case the line deflection is not completely shorted, but only a number of windings are shorted, the oscillogram is there without the oscillation and a current of the external DC supply of approx 200mA.



4. A = 100V/div test point L1 at collector line transistor
   time base = 5µS/div
   Current from external DC supply approx 150mA
   So flyback time is shorter, one extra pulses in between, 150mA supply current
   → **Flyback C2425 open**



5. A = 100V/div test point L1 at collector line transistor
   time base = 5µS/div
   Current from external DC supply > 1A
   So 2 pulses per cycle extra and supply current from more than 1A
   → **Short in picture tube (eg EHT to aquadag)**



6.5.4 Fault finding in the sync part (see also fault finding tree)

1. Antenna out and TXT/OSD-menu is stable (OK)
   - DDP and line seems to be OK
   - Probably synchronisation problem in the video processor (HA, VA) or Feature Box (HD, VD)
2. Antenna out and TXT/OSD-menu is not stable (scrolls)
   - No synchronisation at all, so DDP or line problem

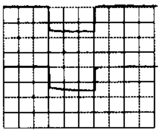
6.5.5 Fault finding no picture and no protection LED → problem in the video controller (TDA4780) part

In case there is no picture and no protection, most likely there is a problem with the BC_INFO (TDA4780 or RGB amplifiers or picture tube).

Normal start up procedure:
Connect a video generator (eg PM5518) with a white pattern to the tuner and trigger the oscilloscope field frequent (a more stable picture is obtained if triggered at VD of the Feature Box; pin 6 S48).

1. First phase of start up; 4 white measuring lines (lines 15, 16, 17, 18) and the main picture is muted (these oscillograms are best visible if the picture tube is cold);

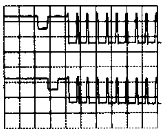
   Red and green (or blue) gun
   100V/div DC
   50µs/div
   4 measuring lines white



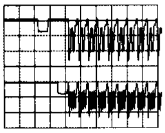
   Total beam current is measured and feedback to pin 19 TDA4780.
   The TDA4780 checks whether the voltage at pin 19 TDA4780 (IC7500) is ≥ 4V5 (during these lines)
   Yes → go to phase 2
   No → remain in phase 1

2. Second phase of start up; each beam separately is measured and the main picture is still muted. Line 15 is Red, line 16 is Green and line 17 is Blue. By now BC_INFO is measured:
   - Differences are compensated
   - If differences are minimal then go to phase 3

   Red (line 15) and green (line 16) gun
   50V/div AC
   50µs/div



   Red (line 15) and blue (line 17) gun
   50V/div AC
   50µs/div



3. After start up the picture is present and differences in cut-off points of the R, the G and the B gun are compensated continuously

Repair procedure

In case of no picture and no error codes
- Switch on the set
- In a 4x3 set, press compress (16:9)
- In a 16x9 set, shift down the picture

Now you can see in which start up phase the set is:

1. **A bright white line** (first phase of start up procedure)
   → there is a monitor pulse, so the TDA4780 + picture tube + RGB amplifiers are OK
   → there must be 4V5 feedback at pin 19 TDA4780
   → If no 4V5 fault in feedback loop

2. **Small R and G and B lines**
   (second phase of start up procedure)

   TDA4780 is OK

   Probably one gun of the picture tube is bad
   → Measure at pin 19 TDA4780 which feedback line (the R or G or B line) is less; the corresponding gun is wrong (amplifier or gun)

3. **No lines visible**
   Measure pin 19 TDA4780

- 0V	Check TDA4780 (sandcastle and the supply voltage)
- 5V	Check RGB amplifiers Short pin 19 TDA4780, now there will be measuring lines (at continious 5V phase 1 and 2 are bypassed)
- Pulses	there is a measure line, so the TDA4780 is OK Measure on cathode on the CRT panel if the measure lines are present: Yes → BC_INFO circuit is open or no HEATER voltage No → RGB amplifier problem

8. Electrical adjustments

General alignment conditions

All electrical adjustments/alignments should be made under the following conditions:

- ★ Power supply voltage: 220-240V ± 10%; 50-60 Hz ± 5%.
- ★ Warm-up time ≈ 10 minutes.
- ★ Voltages and oscillograms are measured in relation to tuner earth (with exception to the voltages on the primary side of the power supply). **Never** use the cooling fins/plates as earth.
- ★ Test probe: Ri > 10 MΩ; Ci ≤ 20 pF.

8.1 Large signal panel adjustments [A]

8.1.1 +141V power supply voltage

- Connect a voltmeter to the positive side of C2569.
- Using **R3559** adjust the power supply voltage to +141V ± 0V5.

8.1.2 Focusing

This is adjusted using the focus potentiometer (uppermost on the line transformer).

8.1.3 Vg2 adjustment

- Use the Service Alignment Menu to switch on the Vg2 test pattern (see paragraph 8.4).
- With the aid of a DC voltmeter (Ri > 1MΩ) measure the DC voltages on pins 8 of the RGB output amplifiers IC7330, IC7340 and IC7350 on the picture tube panel.
- Determine the highest of the three voltages using the Vg2 (SCREEN) potentiometer on the line output transformer and adjust it to 155V ± 2V.

8.1.4 Horizontal centring (DC offset)

- Use the Service Alignment Menu (see paragraph 8.94) to switch on the geometry test pattern and then select in sequence: Alignments, Geometry, Test pattern on, H-Shift.
- Use H-Shift to adjust the picture in such a manner that the test pattern appears in the middle of the picture tube (video centrallin in the deflection window).
- If the adjustment range of the H-Shift is insufficient, the deflection window can be moved using the jumpers on the DC-shift panel.
- If the DC-shift panel is used the video must then be placed in the middle of the deflection window again via H-Shift.

Remarks:
The 'Horizontal Shift' adjustment in the Service Alignment Menu **cannot** be adjusted using the internal test pattern. An external test pattern from a generator or an aerial is required for this purpose.

8.2 Small signal panel adjustments [K]

8.2.1 Y/CVBS level

- Feed in a CVBS grey scale signal with a nominal amplitude (between black and white) to pin 20 of EXT1 and select the picture on EXT1.
- Use **R3503** on the SSP to adjust the amplitude of the signal to 345mV$_{pp}$ (between black and white) on pin 8 of IC7500 (TDA4780) on the SSP (K).

8.3 TXT + control module [J3] adjustments

8.3.1 24 MHZ crystal for Text DualScreen

- Select a programme using teletext.
- Activate the Text DualScreen mode.
- Adjust **L5465** so that the teletext half is stable on the screen and when turning to both the left and right some margin remains.

8.4 IF module adjustments [L]

8.4.1 AGC (Automatic Gain Control) take-over point adjustment

Rough adjustment:
- In case the picture from a local transmitter is distorted, adjust the AGC using **R3140** until the picture is no longer distorted.

Fine adjustment:
- Connect a video generator (e.g. PM5518) to the aerial input.
- Select a 475.25 MHz colour bar without sound.
- Set the video generator to its highest level.
- Select the Service Default Mode by means of the <DEFAULT> key on the DST or by briefly shorting the SERVICE DEFAULT MODE pins.
- Connect an oscilloscope to the output of the tuner (pin 17).
- Adjust the AGC take over point using **R3140** so that the oscilloscope indicates 0.5V$_{pp}$.

8.4.2 AFC (Automatic Frequency Control) adjustment

- Select 'MANUAL' adjustment in the installation menu.
- Select a transmitter frequency of 175.25 MHz (upper left on the screen) by means of the digit keys and the PROGRAM +/- keys. Once the frequency has been accurately adjusted using PROGRAM +/-, the set is forced to that frequency and the AFC adjustment is switched off.
- Connect a video generator with a colour bar and a frequency of 175.25 MHz to the aerial input.
- In a 'Multi West Europe' set (-/12) select system BG on the video generator and system 'WEST-EUROPE' in the installation menu.
- In a 'Multi French' set (-/05/19) select system L on the video generator and system 'FRANCE' in the installation menu.
- In a 'Multi East Europe' set (-/58) select system DK on the video generator and system 'EAST-EUROPE' in the installation menu.
- Connect a multimeter to the AFC output on pin 12S59.
- Use **L5165** to adjust the AFC to 2V6.

8.4.3 *34.4 MHz adjustment for 'Multi West Europe' (BGLM -/12) and 'Multi East Europe' (BGLMDK -/58) sets*

- Select a program with system 'AMERICA' or go to the installation menu and make a program with system 'AMERICA'.
- Connect a video generator to the aerial input.
- Select system NTSC M with 1kHz sound and a fully black picture.
- Connect an oscilloscope to connector 10S59 (CVBS_TERR) and trigger line-frequent.
- Adjust the 34.4 MHz filter using **L5101** so that the sound carrier wave at 34.4 receives maximum suppression (minimum amplitude of the oscillation).

8.4.4 *40.4 MHz adjustment for Multi France sets (BGLL'I -/05/19)*

- Select a program with system 'FRANCE', but not a program in the VHF1 band (so select a SECAM L transmitter).
- Connect a video generator to the aerial input.
- Select system SECAM L with 1kHz sound and a completely black picture.
- Connect an oscilloscope to connector 10S59 (CVBS_TERR) and trigger line-frequent.
- Turn the 40.4 MHz TOKO **L5102** fully to the right.
- Now turn the TOKO slowly to the left until:
  - ⋆ the amplitude of the subcarrier begins to increase, or
  - ⋆ peaks appear in top of the signal.

8.5 Audio Power Supply Module adjustments [AB]

8.5.1 *+16V supply voltage*

- Connect a voltmeter to the positive side of C2307.
- Switch off the load (mute the sound).
- Using **R3311** adjust the supply voltage to +16V5.

8.6 VDS adjustment (Video DualScreen) module [AC]

8.6.1 *AGC (Automatic Gain Control) transfer point adjustment*

Coarse adjustment:
- If the picture of a local transmitter is distorted, adjust the AGC using **R9H5** until the picture has no distortion.

Fine adjustment:
- Connect a video generator (e.g. PM5518) to the aerial input.
- Select a colour bar at 475.25 MHz without sound.
- Drive the video generator to full power.
- Select the Service Default Mode using the <DEFAULT> key on the DST or by briefly short-circuiting the SERVICE DEFAULT MODE pins.
- Select VDS mode and select on the right-hand screen the same programme as on the left-hand screen.
- Connect an oscilloscope to the tuner output (pin 17).
- Using **R9H5** adjust the AGC transfer point so that the oscilloscope reads $0.5V_{pp}$.

8.6.2 *AFC (Automatic Frequency Control) adjustment*

- Switch off the VDS mode and select 'MANUAL' tuning in the installation menu of the main screen.
- Select a transmitter frequency of 175.25 MHz (top left in the screen) using the digit keys and the PROGRAM +/- keys. As soon as the frequency is set accurately using the PROGRAM +/- the main and, as a result of this, the VDS tuner, are forced to that frequency and the AFC control is switched off.
- Save these settings and exit the installation menu.
- Connect a video generator with a colour bar and a frequency of 175.25 MHz to the aerial input.
- Select system BG on the video generator and system 'WESTERN EUROPE' in the installation menu.
- Select VDS mode and on the right-hand screen select the same programme as on the left-hand screen.
- Connect a multimeter to the AFC output on pin 23 of IC9R (IF modulator of the VDS modules).
- Using **L9F7** adjust the AFC to 2V6.

8.6.3 *40.4 MHz adjustment for (BGLL'I)*

- Select a programme with system 'FRANCE', however, not a programme in the VHF1 band (therefore select a SECAM L transmitter), for example 475.25 MHz.
- Connect a video generator to the aerial input and select system SECAM L with 1 kHz sound and a full black picture.
- Select VDS mode and on the right-hand screen select the same programme as on the left-hand screen.
- Connect an oscillioscope to connector pin 10 of IC9R (TUN_CVBS) and trigger line frequency.
- Turn the 40.4 MHz TOKO **L9F2** fully clockwise.
- Now turn the TOKO slowly anticlockwise until:
  - ⋆ the amplitude of the subcarrier starts to increase or
  - ⋆ peaks are created on the top of the signal.

8.7 Wireless Dolby transmitter and receiver adjustment [AE]

8.7.1 *Maximum FM frequency sweep adjustment of the transmitter [AE1]*

Fine adjustment with an FM frequency sweep meter:
- Connect a signal generator to the input of the transmitter (pin 1 or 3 of plug 1409).
- Select 1 kHz 600 mV top-top signal.
- Using an FM frequency sweep meter measure the aerial output of the transmitter.
- Using **R3442** adjust so that the FM frequency sweep is 75 kHz.

Coarse adjustment without FM frequency sweep meter:
- Use the wireless Dolby transmitter and receiver.
- Select the same channel for both.
- Connect a signal generator to the input of the transmitter (pin 1 or 3 of plug 1409).
- Select a 1 kHz 600 mV top-top signal.
- Connect a multimeter to pin 2 of plug 1792 on the receiver module.
- Adjust **R3442** on the transmitter to 280 mV top-top on the receiver.

8.7.2 *FM detector adjustment of the receiver [AE3]*

Fine adjustment with a signal generator with FM frequency sweep control:

- Connect a signal generator to the input of the receiver 1710
- Select a 433.750 MHz signal with 1 mV top-top and a FM frequency sweep of 75 kHz
- Connect an oscilloscope to the anode of C2772 (T716)
- Adjust **L5710** to minimal distortion

Coarse adjustment with a pattern generator:

- Use the wireless Dolby transmitter and receiver
- Select the same channel for both.
- Connect a signal generator to the input of the transmitter (pin 1 or 3 of plug 1409).
- Select 1 kHz signal.
- Adjust **L5710** to minimal distortion.

8.7.3 *Pilot tone adjustment of the receiver [AE3]*

Fine adjustment with a signal generator:

- Connect a signal generator to the input of the receiver 1710.
- Select a 433.750 MHz signal with 1 mV top-top without FM frequency sweep.
- Connect an oscilloscope or a frequency counter to the test point T731 close to pin 13 of IC7710.
- Adjust **R3721** to 76 kHz.

Coarse adjustment with pattern generator:

- Use the wireless Dolby transmitter and receiver.
- Select the same channel for both.
- Connect a signal generator to the input of the transmitter (pin 1 or 3 of plug 1409).
- Select a 1 kHz signal.
- Adjust **R3721** to the centre of the range in which the receiver clicks on (stereo indication on pin 7 of IC7710 becomes active (low)).

8.8 VGA module adjustment [AF]

8.8.1 *Two methods:*

- With a video card for which the horizontal frequency is adjustable. Adjust **R3162** such that when the horizontal frequency is above 33.1 kHz, the SVGA detection on the OSD becomes active (32KHZ_DETECT then also becomes 'high').
- Using a signal generator (e.g. PM5326) apply a pulse with a low duty-cycle to the H(PLL) input pin 4 of IC7160 and adjust the frequency to 33.1 kHz. Adjust **R3162** such that at a horizontal frequency above 33.1 kHz, the SVGA detection on the OSD becomes active (32KHZ_DETECT then becomes 'high').

8.9 Adjustments in the Service Alignment Menu; General

Switch on by:

- briefly shorting the service pins 'SERVICE ALIGNMENT MODE' on the SSP;

or:

- pressing the <ALIGN> key on the Dealer Service Tool (DST) (RC7150), followed by keying in the password 3140 and then pressing the <OK> key.

The Service Menu will now appear on the screen.
The following information is now displayed:

1. The software date ('Date') and version ('ID.') of the ROM.
2. The accumulated total of operation hours ('Operation Hours').
3. The contents of the error buffer ('Errors') (the most recent error displayed at the upper left, immediately following 'ERRORS'; see chapter 6.3).
4. The module generating the error ('Defect. Module') (if there are multiple errors in the buffer that have not all been generated by a single module, there is probably another defect. The message 'INDETERMINATE' will then be displayed here).
5. Menu item 'Reset Error Buffer'. The error buffer can be reset by pressing the <OK> key.
   Menu item 'Functional Test'. All devices are tested via the <OK> key. Eventual errors are displayed in the error buffer (the error buffer is not erased; the contents return when the Functional Test is terminated).
7. Menu item 'Alignments'. This enables the Alignments sub-menu to be called up.
   The following alignments can be selected:

   'General':
   Adjustment of 'White Drive', 'Cut-off', 'Vg2 test Pattern', 'Peak White Limiter','PIP brightness'.

   'Normal Geometry':
   General geometry adjustments.

   'Super wide geometry':
   Geometry adjustments for the 'Panorama' position in 16:9 sets.

   'Options':
   Setting the initialisation codes in the set via text.

   'Option number':
   All options together, expressed in two long numbers. The original factory setting for these numbers can be found on the picture tube sticker on the inside of the set.

   'Store':
   Store all adjustments.

The adjustments
General:

- ⋆ Once all alignments/adjustments have been completed the item 'STORE' must be selected to record all the values in permanent memory.
- ⋆ When the option codes have been changed and stored the set has to be switched on and off using the mains switch to activate the new settings (when switching on and off via stand-by, the option code settings are NOT read by the microprocessor).
- ⋆ If an empty EAROM (permanent memory) is detected, all settings are set to pre-programmed standard values.
- ⋆ A built-in test pattern can be called up in various sub-menus. The test pattern generator can be switched on using the item 'TESTPATTERN ON/OFF'. The test pattern only appears AFTER the specific alignment/adjustment has been selected.
  The test patterns are generated by the teletext module.

Electrical adjustments

8.10 Picture tube adjustments in the Service Alignment Menu

8.10.1 *'White Drive'*

- For the first adjustment turn off DNR and 'Contrast Plus'.
- Use the internal test pattern (a white picture). Adjust the white level for the three settings 'WARM', 'NORMAL' and 'COOL'.
- Start in the 'NORMAL' position and take the standard values for green, red and blue as a starting point (value 50) and then adjust red and blue.

The following default values are maintained for the 'white drive' settings:

	Cool	Normal	Warm
R	41	42	45
G	37	36	35
B	30	25	19

8.10.2 *'Cut-off'*

- Before adjusting turn off DNR and 'Contrast Plus', set brightness to step 37 (Brightness: ████████████▮▮▮▮▮▮) and the contrast setting to maximum.
- Use the internal test pattern (a black picture).

The following default values are maintained for the 'cut-off' settings:

	Cool	Normal	Warm
R	25	30	40
G	24	28	34
B	31	25	20

If the adjustment is (much) too low the set may start flashing.

8.10.3 *'Peak White Limiter'*

For all of the above mentioned picture tubes a default value of 28 can be maintained for the 'Peak White Limiter'.

8.11 Small signal adjustments in the Service Alignment Menu

PIP brightness
Adjust 'PIP brightness' in such a manner that the brightness of the PIP picture is the same as the brightness of the main picture.

8.12 Geometry adjustments 'Normal Geometry' in the Service Alignment Menu

8.12.1 *Vertical amplitude and centring*

Select 'Test Pattern on'.

a. Adjust the vertical amplitude using 'V amplitude' so that the test pattern is fully visible.
b. Adjust the vertical centring using 'V shift' so that the test pattern is located vertically in the middle.

Repeat the adjustment of 'V amplitude'.

8.12.2 *Vertical linearity*

Select 'Test pattern on'.
Adjust the vertical linearity using 'V linearity' so that the top and bottom of the picture has equal amplitude.

8.12.3 *Vertical S correction*

Select 'Test pattern on'.
Adjust the vertical S correction using 'V S-correction' so that the vertical amplitude at the top of the picture is equal to the amplitude in the middle of the picture.

8.12.4 *Horizontal centring and amplitude*

Select 'Test pattern on'.

a. Using 'H amplitude' adjust the horizontal amplitude so that the entire test pattern is visible.
b. Feed in an external test signal.
   Use 'H shift' to adjust the picture horizontally in the middle.

Repeat the 'H amplitude' adjustment if necessary.

8.12.5 *East/west adjustment*

Select 'Test pattern on'.

a. Use 'East/West parabola' to adjust the vertical lines until straight.
b. Use 'East/West corner' to adjust the vertical lines in the corners until straight.
c. Use 'East/West Trapezium' to adjust the picture until rectangular.
d. If necessary select 'East/West Top compensation' and adjust as required.

Repeat steps 8.12.5a to 8.12.5c if necessary.

8.13 Geometry adjustments 'Super wide geometry' in the Service Alignment Menu

Only applicable to 16:9 sets

8.13.1 *Vertical amplitude and centring*

Select 'Test Pattern on'.

a. Adjust the vertical amplitude using 'V amplitude' so that the entire test pattern is visible.
b. Adjust the vertical centring using 'V shift' so that the test pattern is positioned vertically in the middle.

Repeat the adjustment of 'V amplitude'.

8.13.2 *Horizontal amplitude*

Select 'Test pattern on'.
Use 'H amplitude' to adjust the horizontal amplitude so that the entire test pattern is visible.

8.13.3 *Vertical S correction*

Select 'Test pattern on'.
Adjust the S correction using 'V S-correction' so that the vertical amplitude at the top of the picture is equal to the amplitude in the middle of the picture.

8.13.4 *East/west parabola*

Select 'Test pattern on'.
Use 'East/West parabola' to adjust the vertical lines until they are straight.

8.13.5 *Horizontal centring and amplitude*

Feed in an external test signal.
Use 'H shift' to adjust the picture horizontally in the middle.

8.14 Luminance delay

A new adjustment has been introduced with the introduction of the TDA9143 (and TDA9144 in GFL). In the 'GENERAL' menu of the 'ALIGNMENTS' menu the item 'Luminance delays' has been added. These 'Luminance delays' adjustment can only be selected if the set is fitted with a TDA9143 (or TDA9144 in GFL).
If 'Luminance delays' is selected, the following sub-menu appears:

- Luminance Delay Pal
- Luminance Delay Secam
- Luminance Delay Bypass

With the 'Luminance delay' adjustments the luminance information is placed on the chrominance information (brightness is pushed onto the colour).

- The Pal adjustment is only active with Pal signals and must therefore also be adjusted with the Pal signals.
- The SECAM adjustment is only active with SECAM signals and must therefore also be adjusted with the SECAM signals.
- The BYPASS adjustment is only active with NTSC signals, whereby the COMB filter is switched on, and with Palplus signals. Therefore, this adjustment can also only be performed for these signals
  (if the adjustment for Palplus signals is correct, then this also is automatically good for NTSC signals with COMB filter and vice versa).

As with all other adjustments, here the modified adjustment is only stored after the 'STORE' command.

8.15 Adjustment on the PIP panel in the Service Alignment Menu

PIP AGC adjustment
The AGC adjustment prevents overdriving of the PIP-tuner if the aerial signal is too strong. Overdriving is visible as a loss of colour and synchronisation in the PIP picture. Amplification has to be adjusted to minimum level, but the PIP-picture should be as free of noise as possible.
At maximum amplification **R3912** is turned fully left, at minimum amplification **R3912** is turned fully right.

Adjustment:

- Apply a (strong) aerial signal of 4mV (72dBmV).
- Turn R3912 fully to the right (minimum amplification). Turn R3912 slowly to the left until the noise in the PIP-picture no longer decreases.
- If an aerial signal is not available, compromise by adjusting R3912 to 30% of its total travel (100% is maximum amplification, fully left).

8.16 Option menu

Introduction
The microprocessor communicates with a large number of IC's in the set. To ensure good communication and make digital diagnosis possible, the microprocessor has to know which IC's have to be addressed. The presence of specific IC's or functions is made known by means of the option codes. Only correct option code settings will ensure a correctly functioning set and signalling of the correct error message in case of a defect.
The options have been divided into different groups. These groups contain the various options for which multiple choices are usually possible.

Just as in the beginning of GFL all options which are contained in the set can be manipulated in the MD2.2 Service Alignment Mode using both the option numbers and the OPTION menu.

- All hardware related options are incorporated under the heading 'Options' of the 'Alignments' sub-menu of the 'Service Alignment Mode'.
- All software related options are incorporated under the heading 'Dealer Options' of the 'Service Alignment Mode", but can also be reached directly via the 'DEALER' knob of the DST.

Electrical adjustments

8.16.1 Options in the Service Alignment Mode

Menu name	**Subjects**	**Options**	**Physically in the set**
TV Systems	IF Type	Multi West Europe Multi France Multi East Europe Multi Global BG-only	BGLM set; IF module with L5101 (without junper 4111) (diagram L) BGLL'I set; IF module with L5102 (diagram L) BGLMDK set; IF module with L5101 and jumper 4111 (diagram L) This IF-module is not planned only BG set; IF module without TS7120, 7121, 7123 and 7122 (diagram L)
Stereo Decoder	NICAM	Yes No	Audio IC7353 on Audio Module is MSP3410 (diagram O / P / P2) Audio IC7353 on Audio Module is MSP3400 (diagram O / P / P2)
PIP	PIP Available	Yes No	PIP module present (diagram S) PIP module not present (diagram S)
	PIP Tuner	Yes No	Second tuner PIP U1775 on PIP panel present (diagram S) Second tuner PIP U1775 on PIP panel not present (diagram S)
Teletext	TXT	not available 128 KB 512 KB 1 Mb	no teletext IC7490 is a 128kB (100 pages) teletext memory (code '256' in DRAM typenumber) IC7490 is a 512kB (400 pages) teletext memory (code '400' in DRAM typenumber) IC7490 is a 1MB (800 pages) teletext memory (2 code '400' DRAM's needed which is not possible in MD2.2)
	Level 2.5	Yes No	Level 2.5 TXT (only software related; in MD2.2 always level 2.5 software) Level 1.5 TXT
Communication	Easylink	Yes No	Project 50 (easylink) set No project 50 (easylink) set
Picture tube	CRT Type	4:3 16:9	4:3 picture tube 16:9 picture tube
	Picture Rotation	Yes No	Frame rotation circuitry present (IC7050 diagram G) Frame rotation circuitry not present (IC7050 diagram G)
Video Repro 1	Frame	50/60 Hz 100/120Hz Digital Scan Natural Motion	No Feature Box present Eco Feature Box present (diagram M1) Feature Box 3 present (digital scan) (diagram M1) Feature Box 4 present (digital scan and natural motion with MELZONIC IC7447) (diagram M2)
	Dynamic Contrast	Yes No	SMARTIC IC7008 on the AI module present (diagram N) SMARTIC IC7008 on the AI module not present (diagram N)
	Digital Panorama	Yes No	PANIC IC7010 on the AI module present (diagram N) PANIC IC7010 on the AI module not present (diagram N)
	Auto Format FBX (AARA)	Yes No	Only in 16:9 sets with PANIC IC7010 and SMARTIC IC7008 present on the AI module (diagram N) All other configurations
	Auto DNR	Yes No	LIMERIC IC7006 on the AI module present (diagram N) LIMERIC IC7006 on the AI module not present (diagram N)
	PALplus	Yes No	PALplus panel is present (diagram N2) PALplus panel is not present (diagram N2)
Video Repro 2	Combfilter	Yes No	Comb filter present (diagram Q) Comb filter not present (diagram Q)
	Lum. Trans. Improv.	Yes No	IC7508 TDA9177 present (diagram K) IC7508 TDA9177 not present (diagram K)
	Macrovision Prot.	Yes No	IC7352 is TDA9143 / TDA9144 (diagram K) IC7352 is TDA9141 (diagram K)
	Wide Screen Sign.	Yes No	Wide screen signalling bits for automatic 16/9 selection is enabled (only software) Wide screen signalling bits for automatic 16/9 selection is disabled (only software)
	TXT/EPG DualScreen	Yes No	IC7461, IC7462 and IC7463 present on the TXT+control module (diagram J) IC7461, IC7462 and IC7463 not present on the TXT+control module (diagram J)

9. Ciruit description

Power supply

9.1 Audio power supply

9.1.1 Introduction

In a Dolby set with a sound power of 4 x 15W the power supply of the large signal can deliver insufficient power. Therefore a separate power supply is selected for the sound (+16V and -16V). The so-called 'Audio power supply' is a derived version of the SOPS (Self Oscillating Power Supply) from the FL1-PTV an can supply up to 100W at maximum power.
This SOPS is a mains isolated power supply and the feedback takes place by means of an opto-coupler. Part of the +16V is branched off via potentiometer R3311.
This voltage drives the pulse width controller, which switches on TS7305 and the diode of the opto-coupler earlier or later.
This photodiode drives the phototransistor of the opto-coupler in turn, as a result of which switching transistor TS7302 is switched off earlier or later via TS7310 and TS7311.
Since this power supply is a SOPS, it has no fixed operating frequency. The nominal operating frequency is 60 Hz.
The maximum frequency (at Uin = 264V AC and min. load) is 75 kHz. The minimum frequency (at Uin = 198V AC and max. load) is 45 kHz.
The stabilization is achieved by controlling the pulse width.
In standby the power supply is adjusted back to 0V. The power supply is resistant to short-circuit and contains an over-voltage protection.

- *Switching transistor conducts, energy in the transformer*
  When the switching transistor conducts energy is stored in the transformer. The moment that the switching transistor stops conducting is determined by the pulse width controller which monitors the +16V output voltage and the +300V input voltage.
- *Switching transistor reverses, energy from the transformer to the load*
  As soon as the switching transformer reverses, the energy which is in the transformer is transferred to the load. As soon as all of the energy which was in the transformer has been siphoned to the load, the switching transistor starts to conduct again automatically via decay (see self-oscillation).

9.1.2 Pulses on transformer T5305 in normal operation (Fig. 9.1)

As long as the switching transistor is closed, energy is stored in the primary winding 5-1 and supplied to the measuring coupling 8-7:

- ⋆ As a result of the switching of switching transistor TS7302, pulses with a peak of 900V are induced on pin 5 of the primary winding. This winding is used to store energy in the transformer.
- ⋆ The positive voltage on pin 8 (+12V) is used as the measuring coupling voltage. This voltage is used to make switching transistor TS7302 conduct extra fast (due to the direction of D6307, winding 8-7 is the only winding which carries current so long as energy is stored in the transformer).

At the moment that switching transistor TS7302 is opened, the energy which is in the transformer is syphoned to the load:

- On the primary side:
  - ⋆ The winding 9-7 is in phase with the feeding primary winding 5-1. The positive pulse on pin 8 acts as a type of protection which ensures that the switching transistor is unable to conduct as long as there is a high) positive voltage present on pin 5.
- On the secondary side:
  - ⋆ The positive pulses on pin 22 are rectified and smoothed in order to create the +16V supply voltage.
  - ⋆ The negative pulses on pin 12 are rectified and smoothed in order to create the -16V supply voltage.
  - ⋆ The positive pulses on pin 20 are rectified and smoothed in order to create the power supply for the opto-coupler.
  - ⋆ The negative pulses on pin 14 are used to charge C2312 negatively. This negative voltage on C2312 is used to drive the pulse width controller.

9.1.3 Starting up the power supply during the first 50Hz cycle (Fig. 9.2)

When the first positive half power supply pulse (50 Hz) 'arrives' then via the starting circuit (R3301, R3302, R3306 and L5302) a positive voltage arrives on the base of switching transistor TS7302. As a result of this TS7302 starts to conduct and causes a linear increasing current through primary winding 5-1 of the transformer. This causes the voltage on pin 5 of the transformer to drop and the voltage over the primary winding 5-1 to increase.
Because the voltage over winding 5-1 increases, the voltage over the measuring coupling winding 8-7 also increases causing the voltage on pin 8 to also increase (pin 7 is kept at a constant -5V; see -5V generation). As a result of this an additional starting current is fed back, from pin 8 via C2304 and R3329, with the starting current through R3301 (avalanche effect). This additional starting current runs via 2 routes:

- For rapid changes - in other words during start up - C2304 forms a short-circuit. Therefore the current path C2304, R3329 provides a *short, strong* additional current pulse.
- At the same time a linear increasing positive feedback current flows through D6307 as a consequence of L5303. As a result of this, switching transistor TS7302 conducts more and the voltage on pin 5 drops even faster until the switching transistor is saturated. This current path therefore *maintains* the additional current pulse up to the first self-oscillation (see the description for self-oscillation).

In the event of any breakdown of TS7302 between C and B, the base voltage is limited to 1V8 by means of D6324, D6325 and D6336. As a result of this the transistors on the primary side of the control loop (TS7304, TS7310, TS7311 and TS7315) are protected.

Menu name	Subjects	Options	Physically in the set
Personal	Blue Mute	Yes No	Blue mute active in case of no picture detected Noise in case of no picture detected
	Favourite Programmes	Yes No	Favourite program selection enabled Favourite program selection disabled
	Virgin Mode	Yes No	TV starts up once with language selection menu after mains switch on for the first time (virgin mode) TV does not start up once with language selection menu after mains switch on for the first time (virgin mode)
	Standby Toggle	Yes No	Standby toggle activated; by the standby knob the TV is switched to standby and back to normal operation again Standby toggle de-activated
	Auto Store Mode	none PDC-VPS TXT page PDC-VPS-TXT	Autostore mode disabled (not in installation menu) Autostore mode via ATS (PDC/VPS) enabled Autostore mode via ACI enabled Autostore mode via ACI or ATS enabled
	Multipip	Yes No	Multi-PIP enabled Multi-PIP disabled
	Demo Mode Enable	Yes No	Demo mode enable Demo mode disable
	Auto Format Enable	Yes No	Automatic Aspect Ratio detection (black bar detection) software is enabled Automatic Aspect Ratio detection (black bar detection) software is disabled
	Auto Sharpness Enable	Yes No	Automatic sharpness software is enabled (motion compensation depending on noise level) Automatic sharpness software is disabled
	Auto Motion Enable	Yes No	Auto motion software is enabled (smart keys coupled to nexTView) Auto motion software is disabled
	Auto Smart Control	Yes No	Auto smart control software is enabled Auto smart control software is disabled
	Menu animations	Yes No	Animations at start of menu is enabled Animations at start of menu is disabled
Teletext	Cont. Subtitles	Yes No	Continious subtitles enabled Continious subtitles disabled
	TXT Preference	top flof	Preference to top teletext Preference to flof teletext
	Infoline	Yes No	PDC infoline enabled PDC infoline disabled
	East/West Txt	East West	TXT characters for non -/58 set TXT characters for -/58 set

- If an option selection in the Dealer Mode is not displayed, then that is the result of an option selection in the Service Alignment Mode.
- After the option(s) have been changed, they must be stored via the STORE command.
- The new option is only active after the TV is switched off and then back on again using the mains switch (the NVM is then read out again).

8.17 'Option number'

In case the EAROM has to be replaced, all the options will also require resetting. To be certain that the factory settings are reproduced exactly, both option numbers have to be set. These numbers can be found on a sticker on the picture tube.

Menu name	Subjects	Options	Physically in the set
	Video DualScreen	Yes No	Video DualScreen panel present (diagram AC) Video DualScreen panel not present (diagram AC)
Source Selection	SS Type	Euro MD2	Always in MD2
	Euro AV3	Yes No	3rd EURO connector present (diagram K) No 3rd EURO connector present (diagram K)
Audio Repro	Audio Repro	Basic Incr. sound Dolby + eq.	No dolby, no incredible sound, no graphic equalizer (Audio Module no dolby, no incr; diagram O) No dolby, yes incredible sound, no graphic equalizer (Audio Module no dolby with incred; diagram O) Dolby and so also graphic equalizer (Dolby Audio Module; diagram P / P2)
	Cordless Dolby	Yes No	Cordless dolby transmitter module present (diagram AE) Cordless dolby transmitter module not present (diagram AE)
	Dolby Signalling	Yes No	Automatic switching to dolby controlled by broadcaster is present (only software) Automatic switching to dolby controlled by broadcaster is not present (only software)
Miscellaneous	El. Program Guide	Yes No	IC7204 (flash memory) present on TXT+control module (diagram J) IC7204 (flash memory) not present on TXT+control module (diagram J)
	VGA	Yes No	VGA module present (diagram AF) VGA module not present (diagram AF)
	Telephone link	Yes No	Telephone interface panel present (diagram AJ) Telephone interface panel not present (diagram AJ)
	Heatsink Present	Yes No	Heatsinks present on CRT+scavem panel (diagram E) Heatsinks not present on CRT+scavem panel (diagram E)
	Philips logo	Yes No	Philips logo in Virgin mode and Demo mode (only software) No philips logo in Virgin mode and Demo mode (only software)

- If an option selection in the Service Alignment Mode is displayed in black letters, then that is the result of a different option selection in the Service Alignment Mode.
- After the option(s) have been changed, they can be stored via the STORE command.
- The new option is only active after the TV is switched off and then back on again using the mains switch (the NVM is then read out again).

8.16.2 Options in the Dealer Mode

Menu name	Subjects	Options	Physically in the set
Picture	Sharpness in menu	Yes No	Sharpness in picture menu Sharpness not in picture menu
	Tint in menu	Yes No	Tint (normal warm cool) in picture menu Tint (normal warm cool) not in picture menu
	CTI	Yes No	CTI enabled CTI disabled
	Subtitle Squeeze	Yes No	Subtitle squeeze enabled (moves subtitles upwards in case they would fall of the screen) Subtitle squeeze disabled
	Digital Options	100 Hz Digital Scan Natural Motion Nat. Motion Demo Split Screen	Only 100Hz is possible Only 100Hz and Digital scan is possible 100Hz and Digital scan and Natural motion is possible Demo mode; active areas are coloured in a black and white picture Demo mode; lower part is digital scan + natural motion / upper part is only digital scan

Ciruit description

9.1.4 *Through-starting via self-oscillation (from the 2^{nd} 50Hz cycle up to take over by the control loop) (Fig. 9.2)*

Self-oscillation takes place as long as the secondary voltages are still not too low in order to allow the control circuit to work (so that it can still not be adjusted back).

- Immediately after starting up a linear increasing current flows through primary winding 5-1 which can never be higher than hfe x Ib.
- At the moment that this point is reached the primary winding 5-1 will hold its voltage as a result of which the impedance of the primary coil will start to drop. As a result of this the voltage over primary winding 5-1 and over the positive feedback winding 8-7 drops. The positive feedback current, the base and, as a result of this, the collector current of switching transistor TS7302 also drop, resulting in this starting to reverse.
  As a result of this pin 8 of the positive feedback winding becomes negative. The base voltage of TS7302 drops, the collector voltage increases, the positive feedback winding and the base voltage become more negative as a result of which TS7302 reverses more quickly (once again an avalanche effect, but now in reverse).
- Now that TS7302 is reversed, all energy which was stored in the transformer is supplied to the load.
  Because the secondary flows want to and can continue to flow (secondary diodes are conducting), the voltages reverse over the secondary windings and as a result of this the voltages over the primary windings also reverse.
  As a result of this the capacity on pin 5 of the transformer can charge up C2305 to the peak value of 900V (300V + (Vsec x n)).
- At the moment that all energy has been transferred from the transformer to the load, a resonance takes place between the primary winding 5-1 and C2305.
- If, during the resonance, the voltage over the primary winding 5-1 becomes positive, the voltage on the positive feedback winding 8-7 will also become positive. As a result of this the switching transistor will again start to conduct. This results in the voltage on the positive feedback winding 8-7 becoming high and the switching transistor again starts to conduct.
- This process repeats itself as a result of which the secondary voltages are built up more and more until the control loop, which provides the stabilization of the SOPS, comes into operation (see pulse width controller).

N.B.:

- Self-oscillation can also take place if the control circuit is faulty.
- Disconnecting pin 5 of the opto-coupler IC7301 and then carefully increasing the mains voltage using the VARIAC can be handy for fault tracing. As a result of this the SOPS is forced to continue running in self-oscillating mode.

9.1.5 *Building up and maintaining the -5V on pin 7 of the transformer (continuous process) (Fig. 9.2)*

In order to be able to quickly switch off switching transistor TS7302 and thus avoid its dissipation, -5V is applied to the base of TS7302 when switching off. The stabilization of pin 7 of the transformer is explained here.

- When switching transistor TS7302 is conducting, pin 8 of the transformer has +12V. Because *68328 and D6327 now* start to conduct, energy can be passed on from the source to the load. The output voltage over R3305 is stabilized exactly at -5V by the Zener -(5V6-0V6) via the 5V6 Zener and D6328 and the 0V6 of the BE of TS7300. R3343 and R3337 limit the current through transistor TS7300.
- During the reversal of switching transistor TS7302 the voltage on pin 8 of the transformer drops to -36V. D6327 and D6326 reverse and energy is no longer delivered to the load.

9.1.6 *Stopping switching transistor TS7302 from conducting (Fig. 9.3)*

The amount of energy which has to be pumped into the transformer has to be determined by the amount of energy which the load requires. In order to control this the pulse width controller on the secondary side makes the photo-diode in the opto-coupler conduct at just the right moment, as a result of which the switching transistor is ultimately reversed. This works as follows:
If the photo-diode on the secondary side starts to conduct, the photo-transistor on the primary side of the opto-coupler also conducts. As a result of this TS7310 starts to conduct, causing TS7311 to conduct. As a result of this the base of switching transistor TS7302 becomes connected to -5V via L5302 and R3306. A short and simultaneously very strong negative base current then flows as a result of which TS7302 reverses quickly and dissipates as little as possible. The quick 'drawing empty' of a transistor with a negative base current is called 'hollowing'.
During the reversal of switching transformer TS7302 there is a positive pulse on pin 5 and, due to this, also on pin 9 of the transformer. During this positive pulse TS7304 conducts as a result of which it is ensured that TS7310 and thus TS7311 also remain conducting. As a result of this TS7302 definitely remains in reverse when the high voltage is present on its collector.
Diodes D6305 and D6333 serve to protect transistors TS7304 and the opto-coupler.

9.1.7 *Pulse width controller (Fig. 9.3)*

Switching transistor reversed, energy to the load
As long as switching transistor TS7302 is reversed there is a negative pulse on pin 12 and pin 14 of the transformer.
The negative pulse on pin 14 charges C2312 negatively via D6315 and R3317 *(negative charging current I_A)*. As a result of this TS7305 reverses and no current flows through the diode of the opto-coupler. The secondary windings now deliver energy to the load.

Switching transistor conducts, energy in the transformer
As soon as all energy has been passed from the transformer to the load (secondary flow then becomes zero) the polarity of the voltages on the transformer reverses (see self-oscillation). Switching transistor TS7302 now starts to conduct and on pins 12 and 14 of the transformer there is now a positive voltage and on pin 22 a constant negative voltage.

Two current routes are created:

- Because pin 12 of the transformer is positive, D6313 and D6314 conduct and C2312 is charged up positively from its negative voltage (*positive charging current I_B*).
- The +16V output voltage is measured directly via TS7303. Because the voltage on pin 22 is now negative D6318 does not conduct as a result of which the base of TS7303 forms a direct reflection of the +16V output voltage via R3310, R3311 and R3312. For example, with an increase of the +16V the base will increase less than the emitter of TS7303, as a result of which TS7303 conducts more and thus generates a larger current (*positive charging current I_C*). Therefore, using R3311 the output voltage can be adjusted to +16V (so long as the switching transistor TS7302 reverses, pin 22 of the transformer is positive, D6318 conducts and the base of TS7303 lifts. Therefore this control only works as long as switching transistor TS7303 is conducting).

These two positive charging currents charge C2312 positively. As soon as the voltage on the base of TS7305 becomes higher than 1V2 TS7305, starts to conduct. The diodes and, due to these, the photo-transistor of the opto-coupler, conduct, as a result of which switching transistor TS7302 starts to reverse.

Load increase

With increasing load, the +17V and the -17V drop:

- Because the +17V wants to drop the base of TS7303 will want to drop by approximately half with regard to the drop of the emitter of TS7303. As a result of this TS7303 is driven less open, resulting in the *positive charging current I_C* decreasing.
- Because the negative pulse of pin 14 decreases when the output voltages are dropping, the *negative charging current I_A* will also decrease. However, due to the TS7303 control the power supply is correct immediately, as a result of which more energy is pumped into the transformer. As a result of this pin 14 again becomes more negative, causing the *negative charging current I_A* to increase again.
- The *positive charging current I_B* will remain constant because that is only related to the level of the primary voltage 300V (see mains voltage variations).

Due to the increased negative charging current I_A, C2312 becomes charged up more negatively and due to the decreased positive charging current I_C, C2312 will be charged up less quickly. Due to these two mechanisms it takes longer before C2312 reaches the 1V2, as a result of which TS7305 is switched later. As a result of this the switching transistor is switched off later and more energy is pumped into the transformer. As a result of this the load increase is compensated.

Mains voltage variations

When the mains voltage becomes lower, the positive voltage on pin 12 also becomes lower (thus lower than 10V). As a result of this the positive charging current I_B becomes smaller, as a result of which it takes longer before C2312 reaches the 1V2.

When the mains voltage becomes higher, the positive voltage on pin 12 becomes higher as a result of which C2312 charges up more quickly. As a result of this the duty-cycle reduces (T-on becomes shorter if T-off remains the same). In order to limit this duty-cycle when the mains voltage becomes too high the current path I_B receives and additional current path via Zener diode D6321 when the input voltage is too high. In this way there is an additional charge on C2312, as a result of which this charges up more quickly and the switching transistor switches off more quickly. The maximum duty-cycle is limited in this way so that the maximum power in the event of over-voltage can not then become greater than for nominal voltage.

9.1.8 *Standby (Fig. 9.3)*

If the set is switched to standby the 'St-By-INFO' is set low by the standby-µP (active low). As a result of this TS7312 reverses in standby, as a result of which TS7306 conducts via the +5STANDBY supply voltage, R3341 and D6317. Therefore, the diode of the opto-coupler conducts continuously in standby and the 'Audio power Supply' is completely adjusted back to 0V output voltage. In standby the photo-diode continues to be supplied by the +5STANDBY via D6316.

9.1.9 *Protections (Fig. 9.3)*

When a fault is detected on the 4 x 15W sound power amplifier panel, for example because the +16V or the -16V is too low or too high), this panel makes the 'DC PROT' line high (+5V). As a result of this TS7306 will conduct and adjust the power supply completely back (same principle as in standby).

D6316 ensures at the same time that switching transistor TS7302 does not become faulty if the positive voltage is not present on pin 12. The photo-diode is then supplied with the +5STANDBY.

As long as the +17V is greater than 19V4 then, via D6311, R3318, D6331 and D6308, transistor TS7306 will conduct and the power supply will be adjusted back to 0V.

9.2 Changes to the power supply section of the large signal panel

9.2.1 *Semi-standby mode*

For the main supply on the large signal panel it is the intention that in certain conditions the set can be placed in the semi-standby mode, for example as in EPG mode. This means that the power supply works completely but that the series switch is switched off so that the line stage does not operate. The switching on or off of the series switch takes place from the SSP panel via the 'SLOW DOWN' line. This semi-standby principle existed already in MD2.1 (i.e. when starting up the set the series switch must initially be open), but for MD2.2 there are a number of changes which have been made in the power supply section.

	TS7302 conducts, therefore energy into the transformer	**TS7302 reverses, thus energy to the load**	
C2312	positive charging current	negative charging current	
I_A as a result of U_{sec}	0	present	U_{sec} I_A C2312 charged up less negatively
I_B as a result of U_{prim}	present	0	U_{prim} , I_B , C2312 charged up positively more quickly
I_C as a result of U_{sec}	present	0	U_{sec} I_C C2312 charged up positively less quickly

9.2.2 *Degaussing circuit (only for EPG)*

Principle

When changing over from standby to semi-standby in the EPG mode then the degaussing will not work correctly because people can be frightened by unexpected degaussing. To avoid this the degaussing may only take place if the mains voltage is switched off completely and then back on again. For this purpose the control of TS7507 is adapted for sets with EPG.

Operation

When switching on the degaussing switch, TS7505 is triggered via winding 5-6 of the transformer L5550 and TS7515 so that the degaussing can start. C2514 changes up via R3532. When, after this, C2514 is sufficiently charged up (this is determined by D6514), TS7513 and, as a result of this TS7514, will start to conduct. Once TS7514 is fully conducting, TS7512 will continue to conduct and, as a result of this, TS7514 will again continue to conduct (TS7512 and TS7514 together form a thyristor function) until the mains voltage is completely switched off.
Because TS7512 now remains conducting, the base of TS7515 remains high so that this continues to be reversed, with the result that TS7507 remains switched off until the mains voltage is completely switched off.
The number of windings on the transformer is increased so that even in standby the 'thyristor' TS7512-TS7514 remains operational. As a result of this, switching the degaussing back on is only possible after C2514 is sufficiently charged up, in other words after switching off the set.

9.2.3 *Changes to the primary side for reduced standby power (only for MC44604) (Fig. 9.4)*

Introduction

In order to reduce the dissipated power in standby (without degaussing) (< 2W) a new control IC has been selected, namely the MC44604 instead of the MC44603 (the power supply with the MC44603 consumed 3.75W in standby). This new IC has an integrated 'optimalized standby function'.

Higher burst frequency (the number of burst periods per unit of time)

In order to reduce the dissipated standby power the under-voltage level of IC7520 is increased only in the standby mode, as a result of which the burst frequency (the number of burst periods per unit of time) is increased.
This is done as follows:
In standby the Vcc of IC7520 increases via R3528 to the level Vth. As soon as Vth is reached the IC starts operating and generates control pulses. The power supply will now start up. Because the start-up circuit is unable to deliver sufficient current, the Vcc is normally taken over by the take-over winding 9-8 of the transformer. However, in standby mode the power supply is adjusted back so much that the take over is insufficient and the Vcc sinks immediately.
As soon as the Vcc arrives below the under-voltage level the IC, and thus the power supply, will be switched off again and the Vcc will increase via R3528. Because with the MC44604 the under-voltage level is increased only in the standby mode, the number of burst periods is increased per unit of time. The frequency at which the power supply tries to start up during the burst is the same as that of the MC44603 and the same as that in normal operation (the power supply is an FFS (Fixed frequency Supply), in other words it also runs at approximately 40 kHz in standby mode).

Other changes to the primary side for reduced standby power for the MC44604

- R3528 is increased for the MC44604 as a result of which the dissipation in this resistor is smaller. In order to ensure that the start-up time is the same as before the C2525 is smaller for the MC44604.
- Because the C2533 (voltage on pin 11 determines the duty-cycle) is smaller for the MC44604, the duty-cycle is built up more quickly as a result of which the slow-start runs more quickly. As a result of this the burst period (the time that the power supply tries to start up in standby) is shorter, as a result of which the power supply itself works more efficiently (less dissipation losses in the power supply itself).

9.2.4 *Changes to the secondary side for the reduced standby power (only for MC44604) (Fig. 9.5)*

Place MC44604 in standby mode

The MC44604 must receive a sign in order to enter the standby mode with reduced burst frequency. Pin 15 of IC7520 is used for this. As soon as the input current on pin 15 is greater than 35 mA then IC activates its standby mode.
In order to create this current surge a change has been made to the secondary side of the main power supply. When the STANDBY signal is low (active), TS7589 will reverse as a result of which the full +5STANDBY power supply suddenly arrives on the positive side of C2590. C2590 is unable to follow this rapid change and drives TS7588 into full conductance as a result of which a large, brief current starts to flow through the photo-diode of TS7556 (opto-coupler). As a result of this a brief, strong current peak which flows to pin 15 of IC 7520, is generated on the primary side and the MC44604 activates its standby mode.

Maintaining power supply in standby mode for a power supply with the MC44604

Because C2590 charges itself up as soon as the standby mode is activated, at a given moment TS7588 will start to reverse. Because TS7591 only conducts continuously in standby mode (only in the standby mode is the +5STANDBY power supply on the base of TS7591 via R3586 and R3598), a current can only still flow through the diode of the opto-coupler via D6592 and TS7591 to earth. This current is large enough to maintain the standby state. Because TS7591 also conducts during the 'burst' (the time that the power supply tries to start up in standby) the power supply is adjusted back even harder during the 'burst'. As a result of this the 'burst' will not last as long.

Stable +5STANDBY with the MC44604

In order to prevent that the +5STANDBY becomes too low in standby mode as soon as the input voltage of the voltage stabilizer IC7560 is at the lowest point (as a result of which even a POR could be generated), a few changes have been implemented for the power supply with the MC44604:

- Due to the higher burst frequency the ripple on the 5STANDBY is smaller. As a result of this the smoothing capacitor C2571 can be smaller.
- D6561 has been replaced by a type with a low forward voltage (0V2), as a result of which less voltage loss occurs.
- The transformer has been examined again in order to obtain improved efficiency in standby mode.

In this way it is ensured that the input voltage of the voltage stabilizer IC7560 is always large enough to create the +5STANDBY.

Changes for normal operation with the MC44604

- D6550 is added to protect the power supply if the +5STANDBY fails. If the +5STANDBY fails, the STANDBY signal drops out as a result of which TS7592 starts to reverse. As a result of this thyristor TH7590 starts to conduct as a result of which the voltage over C2561 and C2571 will become too high. Zener D6550 has been added in order to protect these capacitors. At the same time this Zener ensures that the power supply is adjusted back to its maximum. The power supply will start up again, be adjusted by the maximum again, etc.→ hick-up mode.
- Because more energy is demanded from the +8V6 power supply in the MD2.2, the +8V6 voltage stabilizer IC7569 is a type which only requires low over-voltage in order to be able to generate a stable +8V6 (a so-called 'low drop' type).

9.2.5 *Primary over-voltage for the MC44604 (Fig. 9.4)*

Over-voltage detection for the MC44604
For the MC44603, over-voltage detection takes place via the Vcc input of the IC. In the MD2.2 for an MC44604 the separate OVP input is used on pin 6 of the IC. Since the Vcc depends too much on the mains voltage (+300V DC) and the load, it is possible that at high load large peaks arrive on Vcc as a result of which the OVP is triggered. Therefore, the voltage on winding 9-8 of the transformer is detected via a clamp circuit and a divider (D6548, R3548 and R3549). Only if pin 6 becomes higher than 2V5 will the power supply go into protection (hick-up mode).

Operation at increased input voltage (+300V DC)
In order to obtain a more constant output power as a function of the mains voltage, R3529 is added between the +330V DC and the current sense pin 7 of the IC. This sets a DC component which is dependent on the level of the +300V DC on the current sense input at the top of the current sense voltage, such as that which is measured on the source of the TS7541 FET-link. As soon as the +300V DC increases the complete current sense signal is raised a little on pin 7 as a result of which the T-on decreases by a constant value.

Video processing

9.3 PALplus (fig. 9.6)

9.3.1 *Introduction*

With 16/9 sets, the PALplus module takes care of both the vertical conversion and also the improved separation between luminance and chrominance.
The module receives the 8 bit Y, 2 bit U and 2 bit V signals from the A/D convertor in the Feature Box. After the PALplus decoding, the signals again go via the AI panel to the Feature Box, where the 50 Hz picture is converted to 100 Hz. Control is provided by the *snertbus* of the processor on the Feature Box. The PALplus module, the AI PCB and the Feature Box are connected by a series of timing signals.

9.3.2 *General operation*

The MACPACIC (Motion Adaption Colour Plus And Control IC) is controlled by the *snertbus*. The most important
function of this IC is to take care of the separation between luminance and chrominance if MACP is used in the transmitter. The MACPACIC uses both the direct Y, U and V and also those stored in MEM1.
MEM4 is an extra working memory.
The processed picture information is written to memories MEM2 and MEM3.
The VERIC (Vertical Reconstruction IC) reads Y, U and V from memories MEM2 and MEM3 and once again makes a picture of 574 lines from the 430 picture lines by means of the 144 helper lines. This IC is monitored by the MACPACIC which generates a number of clock and sync signals for this.
The module input and output are 16 MHz. The module operates at 32 MHz.

9.3.3 *Motion Adapter Colour Plus*

The MACPACIC sees to separation of chrominance and luminance if MACP (Motion Adaption Colour Plus) is used in the transmitter. Because of this, the picture is free from chrominance and luminance crosstalk.
The first raster is written to memory MEM1. When the second raster is presented directly to the MACPACIC, MEM1 will be read out causing both rasters to be present at the same time at the MACPACIC input.
MACP can be used independently of the picture mode, i.e. also with 4/3 transmissions.

9.3.3.1 *Film mode*

In the film mode, 50 rasters are made of the 25 pictures in the transmitter. There is no time difference between the successive even and odd rasters. Because of this, the picture information of line N in the even raster will be nearly identical to that of line N in the following odd raster. The chrominance of line N in the first raster is in phase opposition to the chrominance of line N+312 in the second raster. In the receiver, addition of the even and odd rasters will thus produce a Y signal which is free from chrominance. Because of this, no further suppressions of the chrominance
at 4.43 MHz are required in the Y channel.
After the PAL demodulator, frequencies around the 4.43 MHz in the Y signal give a U and V component which is in phase opposition for the lines N and N+312. Addition of two successive rasters in the U and in the V channels will eliminate this colour component.
These operations are termed FCP (Fixed Colour Plus), which produces the same result as a comb filter.

9.3.3.2 *Camera mode*

In the camera mode, unlike the film mode, there is a time difference between the successive even and odd rasters. This time difference causes differences in the successive rasters, especially in content, with fast-moving pictures. The aim will always be to switch over to FCP as far as possible since this gives the best picture quality. This is only possible however if there is almost no difference in picture information with the successive rasters.
Accordingly a movement detector is built into the decoder and this determines for each small part of the picture whether any movement is present. Memory MEM4 is used for this.
With pictures where there is little movement, indicated by the movement detector, switchover to FCP occurs.

With fast-moving pictures the bandwidth of the Y signal is limited to 3 MHz, because of which the chrominance is removed at 4.43 MHz. The resulting Y, U and V are written by the MACPACIC to memories MEM2 and MEM3.

9.3.4 *Vertical conversion*

To reproduce a 16/9 picture in a 4/3 format the 574 picture lines are converted to 430 lines in the transmitter. Because of this, picture information is lost, and without correction this leads to reduction in the vertical resolution.
To be able to make good this loss in vertical resolution, the 'lost' Y information is AM modulated on a 4.43 MHz carrier wave with the same phase as the U signal and is processed in the black bars above and below the picture.
The 72 lines in the black bar above the picture contain the 'lost' information of the upper half of the picture. The 'lost' information from the lower half of the picture is to be found in the 72 lines in the black bar below the picture. These lines with modulated 'lost' information are also termed 'helper lines'.
The VERIC will once again make a picture of 574 lines from the 430 picture lines.
A 'reconstruction' takes place for the Y signal, in which use is made of the 144 helper lines. Since no helper signal is present for U and V, these are determined by 'interpolation'.
When the upper half of the picture is processed, the helper lines are routed to MEM2 and the picture to MEM3. For the processing of the lower half of the picture, the picture goes to MEM2 and the helper lines to MEM3.
Writing to these memories is done by the MACPACIC, readout being carried out by the VERIC.
In film mode, a complete picture is present after two rasters and because of this the conversion will take place for each picture.
In camera mode because of the time difference between two successive rasters there is a difference in picture content because of which conversion must be carried out for each raster. The helper lines are then composed differently and the use of the memory will therefore also be different.

9.3.5 *Transparent mode*

With a non-PALplus transmission, luminance and chrominance are switched through in the MACPACIC.
The top and bottom picture halves are routed respectively into memories 2 and 3. The VERIC then sees to it that the information for the even and odd raster is read in the correct way.

9.3.6 *Detection*

To be able to recognise when this extra PALplus information is present in the video signal and to be able to detect and demodulate this correctly, some extra information is also added.

Line 23 therefore contains no picture information but does contain some signalling bits such as:
- camera or film mode
- MACP used
- helper lines present.

These bits are detected by the MACPACIC.
This line also contains a reference burst with the correct amplitude, DC and phase for the helper lines.
Line 623 contains the reference level for white and black.

9.3.7 *Remarks*

With a PALplus set, the chrominance IC TDA9144 is used instead of TDA9141 or TDA9143.
The helper lines with Y information modulated at 4.43 MHz, are demodulated in the PAL demodulator and multiplexed in the Y signal. Since information which comes out below the back level is present here, the blanking in the IC has been adjusted.
The chrominance IC TDA9144 generates line 22 which contains the references for the black level and the DC level of the helper lines. Some filters in the IC, both in the luminance and in the chrominance channel, are if necessary switched off with PALplus.
There is no PALplus recognition within the TDA 9144.
This means that all PALplus functions from the microprocessor must be indicated via I²C.
The microprocessor in turn receives PALplus recognition information from the PALplus module.
The MACPACIC generates the 16 MHz and the 32 MHz clocks. The phase between these two clock signals is adjusted by S5100.
All processing operations in the PALplus module are digital.

9.4 CRT & Scavem

9.4.1 *Power limiting of the RGB amplifiers*

9.4.1.1 *Introduction*

The RGB output amplifiers are identical to those used in the MD 2.1, though in the lowest segment of the MD2.2, the RGB output stages are no longer fitted with heat sinks. To ensure that the dissipated power, which is produced chiefly at high frequencies, remains within the limits of these output stages, an extra circuit is added. In case of consumption greater than 3.6 W (measured via R3373), this circuit will reduce the definition of the picture. This causes the current consumption of the output stages to fall. In practice, this power reduction circuit will only be activated in case of a picture with a great deal of noise.

9.4.1.2 *Circuit*

The power consumed by the output ICs is detected across resistor R3373; this is fed to TS7374. This is an amplifier with an amplification factor of -1.
The collector voltage of TS7374 is thus equal to the voltage measured across R3373.
If the collector voltage of TS7374 rises, then TS7377 will conduct more and the collector voltage of TS7377 falls.
In case of current consumption higher than 18 mA (3.6 W), the collector voltage of TS7374 becomes greater than 6 V, the collector voltage of TS7377 becomes lower than 11.4 V and because of this, TS7338, TS7348 and TS7358 start to conduct.
When these transistors conduct, a capacitance is placed in parallel with the input signal, causing the picture definition to be reduced and the current consumption, and thus the dissipation too, to fall once again.

9.4.2 *Improved SCAVEM*

To improve Scavem operation, a larger current of about 1 A pp is sent through the Scavem coil. To achieve this, the amplification of the output stage is adjusted (R3408 200 ohms instead of 100 ohms) and the output transistors TS7414 and TS7415 are changed to power transistors (BD139, BD140).

Ciruit description

9.5 Luminance Transient Processor (LTP) (fig. 9.7)

9.5.1 Introduction

In the MD2.2, the LTP IC TDA9177 may optionally be added in front of the video control IC TDA4780. This IC is I^2C controlled and carries out some corrections to the Y signal. These are:
- smart peaking
- step improvement
- noise suppression

9.5.2 Functional description

9.5.2.1 The input signals

The input signals are formed by YUV on pins 5, 9, 7 and a sandcastle on pin 1. The output signals are YUV on pins 20, 16 and 18. The U and V signals are delayed according to the corrections to the Y signal.

9.5.2.2 Smart peaking

Smart peaking is a circuit which only applies peaking to small signal changes; because of this, details in the picture can be seen more clearly. The extent of peaking and the signal amplitude to which smart peaking operates, can be adjusted via I^2C. With large signal amplitudes (e.g. with black-white transitions) there will be less peaking to avoid unwanted shadow effects. When the LTP is used, the software peaking of the Feature Box will be turned off but the hardware amplification continues to operate.

9.5.2.3 Step improvement

This provision ensures than black-white transitions are made even steeper. The result of this is that the picture gives a still sharper impression.

9.5.2.4 Noise suppression

The LIMERIC in the Feature Box determines the noise level in the picture and appraises this by means of the noise figure which is passed on via I^2C to the microprocessor. On the basis of the noise figure, in addition to the degree of noise suppression in the LIMERIC and the degree of DNR, the degree of peaking together with the 'steepness' and the 'coring' in the LTP is now also reduced in proportion with the rise in the noise figure. Because of this, even better noise suppression can be arranged.

9.6 Chrominance notch filter

As well as a chrominance-free Y signal, the COMB filter also produces a few unwanted residues in the vicinity of 4.43 MHz. These residues can be clearly seen when there are sharp colour transitions. To suppress this interference, a filter is fitted between the Y output of the COMB filter and the input of the chrominance IC (IC 7352). This filter is switched on together with the COMB filter. As soon as the COMB filter is switched on (COMB ON/OFF is high), TS7396 will then conduct and the LC circuit (C2351, C2352 and L5382) is switched on. This LC circuit gives an extra 6 dB of suppression at 4.43 MHz.

9.7 Transparent OSDs and menus (fig. 9.8)

9.7.1 Introduction

In the first instance, the operating menus of GFL and MD2.1 consisted of a menu block with a background colour and printed on it the menu text in a foreground colour. With the menus of the MD2.2, the menu block with background colour is replaced by a block in which the main picture is displayed attenuated and the menu text is shown in white on it. With the so-called 'Blending' circuit it is possible to display these so-called 'transparent operating menus' on the screen.
To produce these menus, a number of control signals are required, such as the RGB signals and the Fast Blanking. These four signals were hitherto sufficient to be able to display a menu. However, for the transparent operating menus an extra timing signal is required, namely the COR-NOT signal. The signals are now used as follows:
- At the time that the 'menu block' is written, the TXT-IC produces a low on the COR-NOT line. At that time the blending circuit will ensure that if a specified beam current is exceeded, the contrast is reduced via the beam current limitation in the video controller TDA4780. By only reducing the contrast with effect from a specified beam current, darker picture sequences are displayed unaffected so as to prevent these disappearing completely below the black level.
- However, when text is to be displayed in a menu block, the Fast Blanking information is used to switch off the blending circuit again. Because of this, the contrast is not reduced only where the text is shown in white.

9.7.2 Blending circuit

The blending circuit is located on the TXT+control panel.
If we assume in the first instance that there is no menu (COR-NOT line is high), then TS7453 conducts and TS7454 is in the blocking state. Because of this, TS7455 conducts in such a way that TS7457 blocks sufficiently to ensure that the V_{OUT} can follow the V_{BCI} via the BE of TS7459 and the BE of TS7458. At the time the menu appears, the COR-NOT line will become low and TS7454 will conduct. The resistor division R3445 and R3443 now sees to it that the base of TS7455 is set to 2V8.
- As long as $V_{BCI} < 2V8$, V_{OUT} follows the V_{BCI} via the BE of TS7459 and the BE of TS7458. This applies to the darker picture sequences and so these are not attenuated.
- If a voltage increase to above 2.8 V occurs, the base of TS7455 will only partially rise (due to the voltage division R3443, R3444, R3445). This only partial voltage rise is passed through the BE of TS7455 and the BE of TS7457 to the V_{OUT}. Because of this, the V_{OUT} will rise less strongly only if the V_{BCI} is greater than 2V8 (lighter picture sequences). This results in a reduction in contrast.

In other words, the DC setting of the base of TS7457 governs the changeover point of the contrast reduction (and thus the brightness at which the contrast reduction must begin with transparent menus).

9.7.3 *PIP in front of TXT in a set with blending circuit*

In a set without transparent OSDs and menus (MD2.1), it is desirable to have the PIP card always in the foreground (and thus in front of the menus, in front of the OSDs and in front of the TXT). This is done in MD2.1 via the TXT-KILL line and TS7518 (in PIP-mode TXT-KILL is high causing the FBL-TXT to be short-circuited (deactivated) via TS7518).
In a set with transparent OSDs and menus (MD2.2), the PIP card is placed in the background so that the PIP card is viewed through the transparent OSDs and manus. Only in the TXT mode is it desirable to have the PIP card in the foreground. For this the circuit round TS7221 has been added to the FBL-TXT line on the TXT+control panel. C2220 is chosen so that TS7221 passes the FBL-TXT signal to the TXT-ENABLE only in the TXT mode and not in any other modes.

- Only in the TXT mode is the FBL-TXT line constantly high so that C2220 is charged and TS7221 conducts constantly. The FBL-TXT is passed to the TXT-ENABLE and therefore with PIP the FBL-TXT is short-circuited via the TXT-KILL (PIP in front of TXT).
- In all other modes (e.g. OSDs, menus and TXT-mixed mode), FBL-TXT is not constantly high. Because of this, C2220 is not sufficiently charged so that TS7221 is constantly in the blocking state. Because of this, the FBL-TXT is not passed to the TXT-ENABLE so that with PIP, the FBL-TXT cannot be short-circuited via the TEXT-KILL (PIP behind OSDs, menus, mixed mode).

9.8 Automatic Aspect Ratio Adaption (AARA)

9.8.1 *Introduction*

With certain wide picture transmissions, the WSS bit (Wide Screen Signalling bit) is not included with the transmission. This applies to transmissions in 22/9, 16/9 or 14/9 format.
The customer on the reception side is then faced with a picture where the format is not correctly adjusted (black bars). This can then only be corrected by operating the picture format button on the remote control.
AARA now provides automatic adjustment of the picture format.

9.8.2 *Operation*

The software in the Feature Box contains a 'black bar detection algorithm'. This black bar detection looks to see whether black bars are present at the top or bottom of the picture. This is done by means of the SMARTIC.
If these bars are present for more than 22 seconds then the picture format is corrected to a maximum of 22/9. The picture width is adjusted by the PANIC and the picture height by the PROZONIC/MELZONIC.
Black bar detection operates independently of the operating software of the set.
Black bar detection can be overruled by:

- the WSS bit
- by an external 16/9 status on a scart input
- by adjusting the picture proportions manually

This function is implemented independently by the software in the Feature Box.

Audio processing

9.9 Audio amplifier

9.9.1 *Introduction*

For the MD2.1 sets we had different versions:

- Non Dolby fighter version
- Non Dolby horn version
- Non Dolby subwoofer version
- Dolby subwoofer version

In order to be able to delivery more audio power, for the most expanded MD2.2 a choice can be made for a separate audio amplifier, the so-called Audio Amplifier module. For this the audio power supply has to be stronger, as a result of which a stronger power supply unit - the so-called 'Audio Power Supply' - is used. As a result of this we have one additional version in the top MD2.2 sets:

- Top Dolby subwoofer version 4 x 15W.

9.9.2 *Block diagram of the Dolby subwoofer version (Fig. 9.6)*

The audio signals Surround, Left, Right and Centre originate from the Dolby Audio Module. The power of the output amplifier is 15W per channel.
On the LSP the output amplifier in a Top Dolby subwoofer version is only used for amplifying the surround-sound signal. This has the advantage that a separate channel is provided for both L and the R surround. Because the output signal from the amplifiers is at a DC level of +14V, the outputs are AC coupled to the surround loudspeakers.
On the Audio Amplifier Panel the amplifiers are localized for the Left, Right, Centre and Subwoofer signal.

- The signal which is intended for the subwoofer is a mono signal (L and R are added), because the low frequencies are not direction sensitive. The higher frequencies are filtered out from 270 Hz. The DBE circuit which was previously on the LSP, has now been mounted on the Audio Amplifier Panel. This DBE (Dynamic Bass Enhancement) circuit provides an improvement in the low tone reproduction which is supplied to the subwoofer. The lower half of IC7740 is used for amplifying the subwoofer signal.
- The L and R signals are amplified in the 2 upper halves of amplifiers IC7740 and IC7750. The L and R signals both run via a 200 Hz filter to the internal squeeters which provide the stereo effect, or directly to the internal loudspeakers. In the latter case the input of the subwoofer amplifier is also connected to earth.
- The Centre signal runs via a high-pass filter at 310 Hz and the lower half of amplifier IC7750 to the centre speakers at the bottom centre of the set.

The internal or external selection is determined by a switch on the Clickfit Panel.

9.9.3 *Internal/external selection (Fig. 9.10)*

The selection is made using a switch on the Clickfit Panel which sends either +6V or earth to pins 9, 10 and 11 of IC7735.
For the internal mode pins 9 to 11 (inclusive) are set low. As a result of this all switches are in the lowest position. For the L and R signal which is intended for the squeeters, all frequencies lower than 270 Hz are filtered out first. Before these signals arrive on the output amplifiers they are initially attenuated by R3700, R3701, R3702 and R3703. The power supply for these output amplifiers is symmetric (+16V and -16V), as a result of which all outputs can be coupled directly to the loudspeakers. The amplification is determined internally in the output amplifiers by means of 2 internal resistors between the input and the output.
The Boucherot filter consists of C2746, C2776 and R3746 and serves to filter out oscillations at high frequencies.
All amplifiers are almost identical, only the values of the Boucherot filter can vary depending on the type of loudspeaker which is used.
The subwoofer signal is a mono signal and runs via the DBE circuit to the respective output amplifier in the internal position.
In the internal position the subwoofer signal from the output amplifier is connected to earth, as a result of which the subwoofer is switched off. The L and the R signal is sent directly to the output amplifiers.
The centre channel remains operational, irrespective of the position of the INT/EXT switch.

9.9.4 *Mute circuit (Fig. 9.10)*

The sound can be muted in various ways in the output amplifiers:

- When the supply voltage becomes smaller than +6V or -6V, the IC will automatically interrupt its non-inverting input. This IC therefore automatically suppresses unwanted signals when switching on and switching off.
- The mute can also be activated externally (active low) via the AMP-MUTE2 line, which originates from the mP. This mute is switched off by the remote control, blue mute, programme switching, etc.
- When switching on the mains voltage, electrolytic capacitor 2788 forms a brief short-circuit, as a result of which the voltage is held low at point 2, as a result of which the IC is muted. This avoids a plop when switching on.

9.9.5 *Protecting the audio output stage (Fig. 9.10)*

The supply voltage of the output amplifiers is symmetrical (+16V and -16V). Therefore the outputs from the amplifiers are connected directly to the loudspeakers.
Therefore, during normal operation the output signal contains no DC components. C2761 can absorb any small fluctuations.
If one of the supply voltages now becomes too high or too low or if DC components arrive on one of the outputs because, for example, an IC is faulty, then TS7760 or TS7761 will start to conduct. As a result of this a current flows through R3760 which causes TS7762 to conduct. The DC-PROT / STBY line therefore comes to 5V, as a result of which the Audio Power Supply goes into protection.
If the positive and the negative supply voltages reduce simultaneously, the voltage on C2761 remains at approximately 0V.
On the centre signal there is a DC voltage of approximately 6V, this is on the emitter of TS7767.
When the +16V becomes lower than 11V, TS7767 and thus TS7760 start to conduct and the DC-PROT signal will still be activated.
In stand-by the 16V supply voltage is switched off; the DC voltage on the centre signal is 0V and TS7767 does not conduct. The C AC signal is max. 0.5V and does not influence the circuit.

9.9.6 *DBE circuit*

DBE or 'Dynamic Bass Enhancement' is used in order to obtain an improved lower tone reproduction using the same subwoofer.

- Circuit 1 adds the L and R signals (the subwoofer requires the low information of both signals) and sends this added signal through a low-pass filter. All frequencies higher than 270 Hz are feedback intensely.
- Circuit 2 has a suppression at 70 Hz (90 Hz for Acoustic Horn).
- Circuit 3 has a frequency-dependent feedback. At 60 Hz the feedback resistance, and thus the amplification too is the greatest. D6720 and D6721 form a limiter if the signals one too large. Circuits 2 and 3 together form an amplification of the frequencies around 60 Hz.
- Circuit 4 is an invertor which 'rectifies' the signal again before it goes to the output amplifier of the subwoofer. By using this stage the amplification factor can still be changed if required. At the same time R3728 and C2728 form a filter which truncate all harmonics above 700 Hz which are caused by the DBE circuit.

9.10 Audio path on the Dolby Audio Module for Double Window (Fig. 9.11)

The 'Double Window' feature also has consequences on the audio section. For Double Window it applies that the sound of the main picture (the left picture) always goes to the loudspeakers, while the sound of the second picture (the right picture) goes to the main headphones.
The additional headphone selection takes place by using an additional switch SK4 and TDA9860.
SK4 provides the selection for the various audio sources, while TDA9860 makes the selection between:

- The classic headphones.
- Double Window headphones originating from an external audio source (SK4).
- The mono signal originating from the tuner on the Full Double Window module.

The configuration around SK1 is identical to that of MD2.1 with the difference that in the MD2.1 this switch was mounted on the SSP and all signals required in the MD2.2 are supplied to the Audio Module via a ribbon cable from the SSP, where the switch is now mounted.
Because SK1 is now on the Audio Module, SK4 can now be switched parallel directly here. This HEF provides the selection of the various audio sources for the headphones in Double Window. SK4 is driven by 2 bits of IC7590 which are applied via I^2C.
Both HEF's are supplied with an 8V5 power supply which comes from the SSP.
For SK1 there are two inputs for front: front L/R and front L/L. As a result of this it is possible to place a mono signal, originating from the front, onto both the left-hand and the right-hand channel.

However, SK4 has no automatic answer to both channels for the front input (all inputs are occupied), for a mono front signal only the left-hand loudspeaker will be driven to full power.
This is solved by IC7590. For a mono signal IC7590 places the mono signal on both the left-hand and the right-hand side. IC7590 is a TDA9860 which is also used in the GFL. However, for the MD2.2, 3 functions of the IC are used as additional functions with regard to the GFL (the remaining functions are 1 to 1 identical):

- The selector switch
- The volume control: which can now no longer be executed on MSP3410 because not all audio sources are offered to MSP3410 for the 'Video Dualscreen' headphones.
- The 2 control bits (pin 2, 31) for SK4.

Ultimately the input of IC7590 is sent to the headphones amplifier.

Wireless dolby

9.11 Transmitter (Fig. 9.12)

9.11.1 Block diagram

We can recognise 3 basic blocks in the block diagram of the transmitter:

1. FM transmitter (1403)
   The FM transmitter is a screened module which is I^2C controlled by the main-μC of the TV:
   - ★ At program switching the incoming surround sound signal from the Dolby Audio Module is muted (by the dolby IC SAA7710)) to avoid plops in the surround speakers.
   - ★ At switching off the surround mode, first the incoming surround sound signal is muted (to avoid plops) and then the local oscillator in the transmitter is switched off. As the local oscillator is switched off also the 19 kHz pilot and the 433 MHz carrier are no longer be transmitted any more, which is recognised by the receiver. In that case after 15 seconds the receiver switches to standby.
   - ★ Selection between the 7 channels around the 433 MHz.
2. Audio path
   The basic audio path contains of plug 1409, input buffer IC7401A, a 15 kHz low pass filter L5401 (prevent high frequencies to the compander), a compander (IC7403 and IC7402B) and a buffer IC7404A.
3. Pilot generator
   Although the transmitter transmits a mono signal, a pilot at 19 kHz pilot is used to enable the receiver to recognise whether the received signal is the wanted signal. This 19 kHz pilot is generated by an 38 kHz oscillator and a 2-divider around IC7404D/C.
   Just before injection the pilot is added with the companded and buffered mono surround signal.

9.11.2 Compander

As the transmitter is an FM-transmitter, the amplitude of the audio and pilot signal is 'real time' converted into a FM-sweep. Large amplitudes are converted into a large FM-sweeps, small amplitudes into a small FM-sweeps. Small FM-sweeps have a bad signal to noise ratio and large FM-sweeps increase the required bandwidth. Therefore a so called 'compander' is used to limit the bandwidth and to increase the signal to noise ratio of the transmission. This compander attenuates large amplitudes (e.g. +10 dB to +5 dB), bypass middle amplitudes (0 dB to 0 dB) and boosts small amplitudes (e.g. -20 dB to -10 dB). On the receiver part this correction is corrected back by a so called 'expander'.
The basic compander configuration is given below. There is a variable gain cell (variable resistor inside NE572) in the feedback loop of an Op Amp (NJM). The resistance of the gain cell is controlled by the voltage across C2408 which is charged by the rectifier.

9.11.3 Pilot generation

The pilot oscillator is build around a 38 kHz tuning crystal 5403. Two inverters IC7404E and IC7404F - used as amplifiers - are used to make a buffered 38 kHz square wave signal.
The 38 kHz block is divided by 2 by the circuitry around the inverters IC7404D and IC7404C.

- On the moment the 38 kHz block becomes 'high', D6401 and TS7405 conduct. Via D6401 the input from IC7404D becomes 'high'. The output of IC7404D becomes 'low' and so the output of IC7404C becomes 'high' and keeps the input of IC7404D 'high'.
  As TS7405 conducts, C2438 is charged.
- On the moment the 38 kHz block becomes 'low', D6401 and TS7405 block. By now C2438 is discharged via R3449 as the input of IC7404C is still 'low'.
- On the moment the 38 kHz block becomes 'high' again, D6401 and TS7405 conduct. By now the input of IC7404D becomes 'low' as C2438 is still 'low' and TS7405 conduct. This 'low' on the input from IC7404D is long enough 'low' (via D6401 it wants to become 'high' again), to trigger the hold-circuitry IC7404D and IC7404C to a 'low' state.

The output is a sine wave due to the low pass filter R3450 and C2439. TS7406 is a buffer of the 18 kHz pilot generator.

9.11.4 Pilot and companded surround sound adding

The buffered and companded mono surround signal is fed to TS7410. This TS7410 has 3 functions:

- Adding the buffered and companded surround signal with the 19 kHz pilot.
- Buffer for the surround signal.
- Low-pass filter at 60 kHz via C2435.

Before injection into the modulator input there is the provision to align the maximum modulation (maximum FM sweep of 75 kHz) with potentiometer 3442.

9.12 Master and slave speaker box (Fig. 9.13)

9.12.1 General

The master and slave speaker box can be used wireless and wired. In case the system is used wired the cinch-plug on the master is used as input and the system automatically switches into the wired mode (by then as incoming signal from the TV the amplified surround signal from the rear speaker clickfit connector of the TV is used). Both wired and wireless make use of the amplifier in the master box. The slave box is a loudspeaker only which is driven by the master box. The following main circuitries are located inside the master box:

- Supply
- Receiver
- Amplifier

9.12.2 Supply

The supply consists of two conventional 50 Hz mains supplies.

- The standby supply is built up around mains transformer 5312. This standby supply starts immediately when the mains-switch TV-3 is switched on. By then via bridge rectifier D6312-6315 and stabiliser TS7275 the supply voltages V! and V2! are present.
- The main supply is built up around mains transformer 5313. This main supply is only active when the set is in normal operation and takes over the largest part of the energy delivery to stabiliser 7275 via D6260. In normal operation STBY_COM! is 'high', TS7273 blocks, TS7274 blocks, via R3316 TS7310 conducts and so relais 5310 is energized and the switch is closed.

Different situations:

- *Start up*
  At start up the system with mains switch TV-3, C2293 is charged but is even discharged faster via the 2 diodes D6278 and D6277. TS7272 blocks, TS7274 blocks, TS7310 conducts and so both supplies start up immediately.
- *Switch off*
  At switching off the system with mains switch TV-3, C2293 is not discharged any more via the 2 diodes D6278 and D6277. As a result C2293 is charged quickly and so immediately switches off the main supply. In this way a switch-off plop is prevented.
- *STBY_COM!*
  In case the STBY_COM! signal becomes 'low', the system must go into standby mode. In case STBY_COM! becomes 'low', TS7273 conduct, TS7274 conduct, TS7310 blocks and the main supply is switched off.
- If STBY_COM! is 'low' TS7265 will conduct and switch on the red LED. If STBY_COM is 'high', TS7265 blocks, TS7266 conducts and so the green LED is switched on.
  - ★ STBY_COM! 'low' → receiver in standby mode, main supply switched off, red LED
  - ★ STBY_COM! 'high' → receiver in normal operation, main supply switched on, green LED

9.12.3 Receiver

9.12.3.1 Block diagram

We can recognise 4 basic blocks in this diagram:

1 Frontend (1710):
Here the incoming 433 MHz aerial signal is filtered, amplified and via a mixer converted to a fixed 10.7 MHz IF frequency. The frontend is housed in a separate shielding unit to minimise the local oscillator radiation. There is an antenna connected to the input of the frontend.

2 IF and decoder part (7710):
Here the 10.7 MHz IF signal is filtered via 2 standard FM ceramic filters and fed to the IF FM-demodulator IC7710. In this IF FM-demodulator the mono surround signal is demodulated and the field strength and the presence of the pilot of the incoming 10.7 MHz signal is measured.

3 Audio path:
The received audio signal is filtered and expanded in dynamic range, to correct the companding circuitry at the transmitter side. This circuit uses the NE572 hi-performance circuit with an extra opamp. Basically this circuit multiples the incoming dynamic range with a factor of 2 dB.

4 Microcomputer (7750):
The μC reads the position of the 7-fold channel switch, controls the frontend via I²C and drives its mute pin.

9.12.3.2 IF demodulator

To make discrimination possible between the 7 channels that can be selected some selectivity has to made at the IF channel. Two standard 10.7 MHz ceramic filters with TS7707
in between are used for optimal behaviour towards S/N.
The IF-demodulator IC7710 (LA1805) has a main IF amplifier, and a FM and AM (not used) detector.
The IF-signal comes in at pin 1 and is boosted by a very high gain to a level where it is suitable for detection.
The detector needs a quadrature coil at pin 20.
The detected signal comes out at pin 17 and goes in again at pin 16. The stereodecoder is used for pilot detection only and is a classic system with a VCO (Voltage Controlled Oscillator) running at 152 kHz which can be adjusted by potentiometer 3721.
The AF outputs (pin 9 or/and 10) are filtered and amplified before they are presented to the expanding circuit. The filter 5730 is a double notch filter with filters out peaks at 19 and 38 kHz.

9.12.3.3 Expander circuit (IC7770)

The key IC is the NE572 which is used as an expander. Via this expander, the compander function in the transmitter side is corrected. This expander boost the high amplitudes (e.g. +5 dB to +10 dB), bypass middle amplitudes
(0 dB to 0 dB) and attenuates low amplitudes
(e.g. -10 dB to -20 dB).
The circuit is in fact a standard opamp (NJM) circuit where the input series resistor is formed by a gain cell. This gain cell is a variable resistor that is driven by a current that is obtained by rectifying the input current. Any variation of the cell impedance will change the gain of the main opamp NJM4560. Now the input of the gain cell and the rectifier are tied to the same level. When the input signal Vin drops by e.g. 6 dB, then the gain control current from the rectifier will also decrease with 6 dB (factor of 2).

Therefore the total change in Vout will be 12 dB, giving in fact a factor 2 (in dB) expansion. The detector circuit rectifies the input signal current. The V_{REF} for the opamp is extracted out of the NE572 IC via proper RC elements.

9.12.3.4 *Microcomputer (IC7750)*

The microcontroller is a MC68HC05 type with 1.2 kbit ROM and 14 I/O lines. The μC clock frequency is derived from a ceramic resonator of 4 MHz.
The internal clock is divided down to 500 kHz internally.
The reset circuitry around TS7755 creates a POR for the μC to assure that the μC only starts its program when the supply voltage is stable enough. The μC has the following functions:

- Read the setting of the 7 position slide switch continuously. In an internal look-up table the 7 required frequencies for the local oscillator are stored.
  The μC controls the local oscillator in the frontend 1710 to 1 of the 7 desired channels via the I^2C bus. The output towards the synthesiser chip in the front-end is in I^2C format, however there is no real handshaking as the synthesiser is the only device on the bus.
- In case the μC operates a channel switch, pin 11 is made 'high' for a moment. This to prevent plops when switching from one channel to another.
- In case the μC has detected that the receiver 1710 has received an incoming signal which is under the threshold level for more than 90 seconds, than pin 11 is made 'high' constantly.

9.12.3.5 *MUTE signal*

The MUTE signal on pin 5 of plug 1791 is 'high' in one of the following possibilities (OR-function):

- In case the 10.7 MHz field strength at the input of the IF-detector IC7710 is not strong enough. By then pin 8 of the IF-demodulator IC7710 and so - via D6710 - the MUTE signal becomes 'high'.
- In case the 19 kHz pilot-tone is not detected, pin 7 of the IF-detector IC7710 and so via D3710 the MUTE signal becomes 'high'. Even though the transmission is mono, this pilot tone is used and detected just to recognise that the received signal is the required signal.
- In case the μC operates a channel switch, pin 11 is made 'high' for a moment. This to prevent plops when switching from one channel to another.
- In case the μC has detected that the receiver 1710 has received an incoming signal which is under the threshold level for more than 90 seconds, than pin 11 is made 'high' constantly.

This MUTE signal is used for:

- Direct muting of the AUDIO signal at pin 2 of 1791 via mute circuitry TS7784 and TS7789. These transistors are connected inverse (collector and emitter are changed), but the functionality is the same. In case MUTE is high, the base-collector diode conducts and short the AUDIO signal via the emitter to the collector. In this way a better MUTE behaviour is obtained.
- Further this MUTE signal is fed to the circuitry which drives the STBY_COM! on the amplifier module.
  In case the MUTE signal is 'high' for more than 15 seconds, the STBY_COM! becomes 'low' and the receiver is switched to standby mode (see wireless mode).

9.12.4 *Amplifier*

This module can be used in two modes:

- Wireless mode
- Wired mode

9.12.4.1 *Wireless mode*

The amplified surround audio signal at the clickfits (diagram H2) can also be wired to the master box.
The input from the receiver is present at pin 2 of connector 1262 and fed via the emitter of TS7268 to the input of the amplifier. This signal can be connected to ground by TS7269 in case the STBY_COM! signal 'low' is. Pin 5 of 1262 is the mute pin.
When the MUTE is 'high', TS7270 conducts and pin 3 of comparator IC7262A becomes lower as the V_{REF} at pin 2 (4V6). As a result C2280 discharges via R3280. In wireless mode, the V_{REF} at pin 6 of IC7262B is 6V, and so it takes 15 seconds before pin 5 becomes lower as pin 6 of IC7262B. So in case the mute from the receiver is active for 15 seconds, by then the STBY_COM! will become 'low' and will switch the system to standby.

9.12.4.2 *Wired mode*

In case of wired use the switch in the cinch connector is open and so the supply voltage for the receiver at pin 3 of 1262 is not present any more. The audio signal - via pin 2 of plug 1260 - is fed to the AUDIO-IN! signal and to the low-level detector.
In wired use, the mute signal from the receiver-module should be disabled. If there is no voltage on pin 3 of 1262, pin 5 of 1262 will be forced high by R3305 and D6275 which means a mute state. This will force TS7270 in conduction as long as the wired mode is active. In this way D6276 is blocked and so the receiver-mute is disabled.
In the wired mode, a low-level detector is used, made by the circuitry around IC7260B and TS7260A. IC7260B and IC7206A are used as amplifier. The voltage divider R3320 and R3321 is used to limit the input signal to IC7260. C2269, C2295 and C2289 are used to block the DC-components. Via D6271 and D6272 only the positive pulses are fed though to pin 3 of comparator IC7262A. Only in case the audio level at the input of the low-level detector is lower as 3mV-RMS, pin 3 of comparator IC7262A becomes lower as the V_{REF} (4V6) at pin 2 and so the output at pin 1 IC7262A becomes 'low'.
As long as the input of the low-level detector is lower as 3mV-RMS, output pin 1 of IC7262A is 'low' and so C2280 is discharged via R3280. In case of a wired mode the threshold-level of comparator IC7262B is increased by a current through D6266 and R3277. As a result in wired mode the threshold level at pin 6 is decreased to 1V3. Therefor it takes 90 seconds before the discharged C2280 becomes lower than pin 6 of IC7262B. So only in case of 90 seconds no (or too low) sound, the STBY_COM! becomes 'low' and will switch the system to standby.

9.12.4.3 Amplifier

- IC7267 is the amplifier for both the master and the slave loudspeaker. It has an output power of 2x8W.
- To ensure a proper start up of the amplifier IC from standby to normal operation, pin 1 is used.
  Pin 1 filters the supply voltage at pin 12.
  - In normal operation STBY_COM! and so pin 6 of the IC is 'high' and so internally pin 12 is connected to pin 1.
  - In standby pin 6 is 'low' and so pin 12 is not connected any more to pin 1. During standby C2286 is precharged via the high STANDBY. This is done to realise a fast built up of the voltage at C2286 when the set is going from standby to normal operation in case of a bad charging of C2286 through IC7267.
- D6265 is used to charge C2282 to avoid plops at switching on.
- From normal operation to standby the following takes place in time:
  - Main supply of transformer L5513 is switched off inmediately, but C2314 is still charged.
  - Then C2290 is charged by the 'low' STBY_COM! signal and so - via the conducting TS7269 and TS7268 - the AUDIO-IN signal is muted.
  - Then C2284 is discharged by the 'low' STBY_COM! signal and so the standby pin 6 of amplifier IC7267 becomes 'low'. The amplifier is switched off after the AUDIO_IN is muted to avoid plops.
  - Then C2314 of the main supply is discharged and only the supply of L5312 is supplying energy to the stabiliser 7275.

DualScreen

9.13 Introduction

The wide picture version of the MD2.2 chassis can be provided with the DualScreen feature. In this there are two variants which can be distinguished:

- In the most basic version TXT or nexTView can be displayed next to the main picture. This is called 'text DualScreen'.
- In a higher specified sector it is possible, in addition to this, to display two video pictures simultaneously next to each other on the screen. This is called 'Video DualScreen'. When combined with text DualScreen this is designated as 'full DualScreen'.

Text DualScreen (video/TXT or video/nexTView)

The picture is divided into two, in a horizontal ratio of 60/40. These two parts are filled as follows:

- The video information is compressed horizontally and pushed left to the left-hand 60% of the picture by means of the PANIC on the Feature Box.
- The TXT or nexTView information is compressed horizontally and pushed right to the right-hand 40% of the picture by means of a circuit on the TXT+control module.

The total picture is further compressed vertically by means of the DDP.

Video DualScreen (video/video with sound of the second video picture on the headphones plug)

Two different video pictures are displayed next to each other in a horizontal ratio of 50/50, whereby the sound of the second video channel is fed to the headphone plug. This is achieved using the so-called 'video DualScreen' and 'YUV interface' modules and modified Dolby Audio Module:

- The 1fH YUV main signal is branched off immediately after TDA9143 on the SSP via the YUV interface panel and is fed to the Video DualScreen module.
- The 1fH YUV sub-signal from the second video picture is created on the Video DualScreen module by means of a 2^{nd} tuner, an MF-demodulator and a TDA 9143.
- The YUV main and sub-signals are placed next to each other in the PIPO (Picture In Picture Out). The YUV output signal (YUV-DW) is still always on the base of 1fH and is fed back to the YUV interface. There is a YUV switch on the YUV interface:
  - If the Video DualScreen feature is not activated, the YUV main signal from TDA9143 on the SSP is immediately looped through to the Feature Box.
  - If the Video DualScreen feature is activated, the YUV-DW signal is fed to the Feature Box.

If the Video DualScreen feature is activated, the sound of the second video channel is fed to the headphones plug via a modified Dolby Audio Module.

9.14 Text DualScreen

9.14.1 Horizontal compression of the TXT/nexTView information (Fig. 9.14)

Principle

- SK1 and SK2 are components of the Blending circuit (see chapter Video Processing).
- The TXT information is compressed by the RGB info to be written into a memory and then read out on a double frequency.
- In order to be able to display the TXT information in the 40% screen, all level 2.5 features, including the side panel feature, are switched off by the software. The maximum number of characters which can be displayed per line is reduced from 56 to 40. Since nexTView also makes use of these possibilities it also has the result that the layout of this is modified in nexTView DualScreen mode.
- In order to set the analogue RGB signals at the correct digital level for the memory IC7462 (after all, this IC can only process digital information), an additional buffer has to be fitted between IC7462 and the TXT-IC, IC7400, namely IC7461. Because IC 7461 also inverts the signal, then after reading out from IC7462 an inverter IC7463 is used in order to 'straighten' the signal again.
- Because IC7461 discriminates the RGB (and FBL) level to high or low (no longer any interim steps) TXT level 2.5 colours (32 colours) is automatically returned to TXT level 1.5 colours (8 colours) if text DualScreen is active.
- With the DWE (Double Window Enable) switch line, originating from the operating mP, a selection is made between a complete TXT/nexTView picture or a DualScreen. If DWE is low, the text DualScreen is displayed.

Remark:
Due to the software suppression of level 2.5 features in DualScreen mode, then not only will the side panel feature be switched off but also the background colours, DRCS, etc.

Writing to and reading out of the memory

- The TMS4C1050B (IC7462) is a 4 bit organized memory. This memory is addressed via 2 independently operating reading and writing address counters. In addition to this the IC has a separate data write bus A and a separate data read bus B.
- The D0, D1, D2, D3 inputs are used to write the Blanking and RGB signals into the memory. The following signals are used to control the writing section:
  - **W**rite enable (W) releases the write address counter and gives permission for data to be written into the memory.
  - **ReSeT W**rite (RSTW) provides a reset for the write address counter.
  - **S**erial **W**rite **C**loc**K** (SWCK) is a clock signal which determines the writing speed of the memory.
- The Q0, Q1, Q2, Q3 outputs are used to read out the Blanking and RGB signals from the memory.
  The following signals are used to drive the reading section:
  - **R**ead enable (R) releases the read address counter and gives permission for data to be read out of the memory.
  - **ReSeT R**ead (RSTR) provides a reset for the read address counter.
  - **S**erial **R**ead **C**loc**K** (SRCK) is a clock signal which determines the reading speed of the memory.

In text DualScreen the frequency of the read clock is double that of the write clock.

Creating the clock signals in order to be able to read and write in the Field Memory

In order to provide the memory IC, IC7462, with the required clock pulses, the following circuits are made:

- The TXT-IC gives pin 39 a TCASIN with a frequency of 12 MHz with its harmonic. A band pass filter, with an adjustable coil L5465, only allows the 2nd harmonic to pass. This 24 MHz is used directly as a read clock (SRCK). In order to obtain a synchronous running writing clock (SWCK) which is exactly half the speed of the read clock, the signal is driven through a 2 divider IC7465/A.
- The TXT/IC delivers on pin 3 a line frequency pulse with a duty-cycle of exactly 50% (signal PL). This pulse is used as the clock input for the 2nd flip flop IC7465/B. The vertical flyback pulse (VFB) arrives on the D input. A reset read (RSTR) and a reset write (RSTW) are therefore generated at raster frequency. Since there is a time difference between the two trigger points (rising slope) of these reset signals, the 12 MHz clock is held up to the START moment. In this way the writing and reading are exactly synchronized.
- At the START moment the RSTR is high. As a result of this the 12 MHz write clock is released and the writing into the memory begins. This is exactly at the rising PL slope. The writing is now no longer interrupted until a further frame flyback. A full raster is therefore written into the memory.
- The reading of the memory is stopped just at the moment of START (Read enable is low). Only in the second half of the PL pulse (this is a half line time later) does the Read Enable become high. As a result of this the read address counter is released and the reading out of the memory starts. Since the read address counter is running at 24 MHz clock this reading out runs twice as fast as the writing. Another half a line time later the Read Enable again becomes low and reading out stops again.
  This cycle repeats itself for each line.
  - During the first half of the line the PL is high, the read enable (R) is therefore low; nothing is therefore read out.
  - During the second half of the line the PL is low and the memory is read out at double speed (24 MHz clock)

9.14.2 *Horizontal compression of the video information*

In addition to the compression of the TXT/nexTView section, the video section of the picture should also be compressed. For text DualScreen this horizontal compression is achieved by the PANIC IC in the FBX. Via a software command the picture is compressed in the PANIC and pushed horizontally to the left.

9.14.3 *Horizontal centring of text DualScreen*

In order to arrange the video and TXT/nexTView information neatly at the correct distance beside each other, initially the TXT/nexTView half on the right is set against the side of the picture by the DDP. After this, by means of the software centring of the FBX, the video half is set to the correct horizontal distance with regard to the TXT/nexTView information.

9.14.4 *Vertical compression of the text DualScreen picture*

The total picture for text DualScreen is compressed vertically with the aid of the DDP (vertical deflection is adjusted) in order to again obtain the correct height/width ratio of the video picture. As a result of this black bars are created on the top and bottom of the picture.

9.15 Video DualScreen

9.15.1 *Introduction*

The video DualScreen picture consists of 2 sections of the same size:

- the left-hand section is the main picture originating from the main tuner or from RGB, CVBS or SVHS signals from external sources.
- the right-hand section is the sub-image originating from the 2nd tuner or from CVBS or SVHS signals (no RGB signals) from external sources. The video decoding for the sub-image takes place on the Video DualScreen module and makes no use of the COMB filter. The result is that the picture quality of the sub-image is generally less than that of the main picture.

9.15.2 *Block diagram*

The following blocks can be distinguished on the Video DualScreen:

- PLL tuner E9F1 is a UV1216D which is driven via I^2C.
- A TDA9815 is used for MF demodulation.
  The PCF8574AT controller IC9N is used in order to set the switching signals from the MF demodulator into the correct mode.
- Via a source selector IC9L a selection is made between TUN_CVBS (from the Video DualScreen tuner) or CVBS PIP (from the TEA6415 source selector on the SSP). At the same time this IC9L can be used to select between CVBS-PIP or YC-PIP.
- The Y/CVBS-PIP or CVBS TUNER signal and the C-PIP signal are fed to the TDA9143 IC9J on the Video DualScreen module. Together with the delay line IC9K the CVBS or SVHS signal is converted here to the SUB-YUV signals together with the sync signals SPHsync and SPVsync. The RGB-TXT inputs of this TDA9143 are not used here.
- The sub-YUV signals (SY, SU, SV) together with their sync signals SPVsync and SPHsync and the Main-YUV signals (MU, MY, MV) with their sync signals HA = SC_1fH = DPVsync are placed next to each other in the PIPO (Picture In Picture Out) IC9A SAB9077. The RAM IC9E is used as the memory.
- The output of the SAB9077 DW-YUV signals (DY, DU, DV) are fed directly to the output of the Video DualScreen panel to the YUV interface (in the MD2.2 the function of the switching IC IC9M is on the YUV interface, therefore IC9M and the switching signals DFB1 and DFB2 are not used). Via the switching signal FBLK the YUV interface can be set to the bypass mode (FBLK 'low') or to the Video DualScreen mode (FBLK 'high').
- If the Video DualScreen feature is not active, part of the +5V supply voltages (+5VSW) is switched off via Q9N1 and switching signal VDS STANDBY (VDS STANDBY becomes 'low' (standby mode) 60 seconds after the VDS feature is switched off. As a result of this the load of the +5V supply voltage reduces if the Video DualScreen feature is not used. Because the PIPO is also switched off, then via IC9P and VDS TSNADBY = 'low', the HA and VA sync signals are not looped through to the HA' and VA' sync signals which go to the PIPO. This prevents the non-active PIPO loading the HA and VA signals.
- Because the TXT/nexTView DualScreen are created by a totally different signal path in the MD2.2, connector J9A5, J9A6, the buffers around Q9P1, Q9R1 and Q9S1 and the section of pin 12, 13, 14 of IC9L are not used.

9.15.3 *Tuner and MF section*

The tuner is an I^2C controlled PLL tuner with built-in splitter. The antenna input goes to the Video DualScreen module and is split there into the main and Video DualScreen tuner. The D_TUN pin 8 is the supply for the splitter section. The ADDRESS pin 15 is used to give this tuner a different address on the I^2C bus of the main tuner.

The MF section can handle all of the systems throughout the world and is constructed around the MF demodulator IC9R, the TDA9815 (also used in GR2.4). This is, with regard to pinning, the same as the TDA9811 of the MD2 MF module, however, in the TDA9815 an FM demodulator is built in. In order to select the correct demodulation system and the correct filtering, the following switching signals are used. These switching signals originate from the PCF8574AT IC9N.

System	BG/LL'IMDK	L'	I	POS/NEG	M
BG	1	0	0	1	0
L	0	0	0	0	0
L'	0	1	0	0	0
I	0	1	1	1	0
M	0	0	0	1	1
DK	0	0	0	1	0

The video path

- *BG via SAW filter FL90*
  BG/LL'IDKM is 'high', D9G0 conducts, D9G1 reverses. As a result of this IF2 becomes short-circuited and IF1 is fed to the Video IF inputs pin 1 and 2 of the TDA9815 via the BG SAW filter FL90.
- *LL'IDK via SAW filter FL91*
  BG/LL'IDKM is 'low', D9G0 reverses, D9G1 conducts. As a result of this IF1 becomes short-circuited. Because M-TRAP is 'low', D6G2 reverses and D9G3 conducts as a result of which the IF2 is fed to the LL'IDK SAW filter FL91.
  At the same time D9G5 conducts and D9G4 reverses because M-TRAP is 'low'. As a result of this pin 4 and 5 of FL92 (M SAW filter) become short-circuited and pins 5 and 4 of FL91 (LL'IDK SAW filter) are not short-circuited. Therefore, pins 5 and 4 of FL91 are looped through to pins 4 and 5 of TDA9815 respectively.
  The circuit around L9F2 filters out the sound at 40.4 MHz from the adjacent channel.
- *M via SAW filter FL92*
  BG/LL'IDKM is 'low', D9G0 reverses, D9G1 conducts. As a result of this IF1 becomes short-circuited. Because M-TRAP is 'high', D6G2 conducts and D9G3 reverses as a result of which the IF2 is fed to the M SAW filter FL92.
  At the same time D9G5 reverses and D9G4 conducts because M-TRAP is 'high'. As a result of this pins 4 and 5 of FL91 (LL'IDK SAW filter) are short-circuited and pins 5 and 4 of FL92 (M SAW filter) are not short-circuited. Therefore, pin 4 and 5 of FL92 are looped through to pins 4 and 5 respectively of the TDA9815.
- Pin 30 selects the MF inputs: 'high' for the BG VIF inputs pin 1-2 and 'low' for the LL'IDKM VIF inputs pin 4-5.

- In order to filter sound from the Video IF (VIF), the series connected band reversing filters X9T4, X9T5 and X9T6 are used. X9T4 is only connected in series in the M mode (M-TRAP 'high' therefore Q9F5 reverses and Q9F6 conducts). Pin 21 is the output, pin 22 the input. Finally, the buffered TUN-CVBS signal is present on pin 10.
- AFC oscillator between pins 23 and 24 which is adjusted to 77.8 MHz (2 x 38.9 MHz). The adjustment takes place via pin 23 of the AFC detector. The AFC loop of the Video DualScreen demodulator is not used. The AFC loop of the main demodulator on the IF module of the set itself is used to correct any drift of the transmitter for both the main tuner and for the Video DualScreen.
- Pin 9 is 'high' for BGIDKM (negative modulation) and 'low' for LL' (positive modulation).
- Pin 11 is 'low' in the L' mode (L' 'high') or in the M mode (M-TRAP 'high') via Q9F1. A low pin 11 is interpreted in the positive modulation mode
  (pin 9 'low') in order to de-tune the 38.9 MHz to 32.4 MHz. In the negative modulation mode
  (pin 9 'high') a low pin 11 is interpreted in order to select sound input pin 18 (M audio input) instead of the sound input pin 17 (BGLL'IDK audio input).
- Pin 7 is switchable for the PLL loop filter. For BGIDKM, R9H9 is short-circuited via Q9F2 as a result of which the time constant is changed.
- Pin 6 is used in order to adjust the AGC takeover point via R9H5.

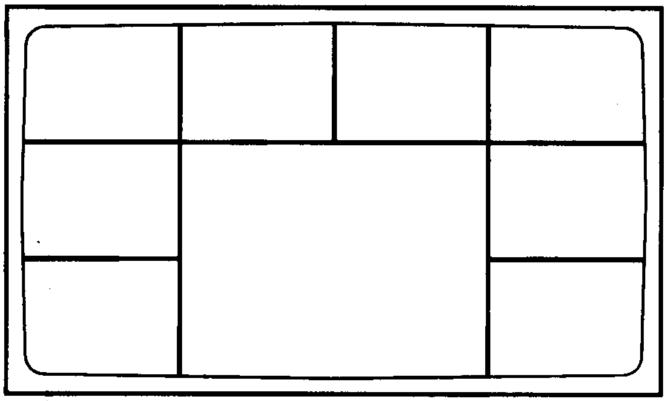
The sound path

The TDA9815 delivers an FM mono or AM mono. Via L9F8 the sound path is disconnected from the picture path.

- *BG via SAW filter FL93*
  L' is 'low', D9G8 conducts, D9G9 reverses, pin 6 of the L9F8 is short-circuited via C9T5. Therefore, the MF signal from the tuner is fed via pin 4 of L9F8 to pin 1 of FL93 (BG SAW filter) and pin 2 of FL94 (LIDK SAW filter). Because BG/LL'IMDK is 'high', D9G6 conducts and D9G7 reverses. As a result of this pins 4 and 5 of FL94 (LIDK SAW filter) are short-circuited and pins 5 and 4 of FL93 (BG SAW filter) are not short-circuited. Pins 5 and 4 of FL93 (BG SAW filter) are looped through to pins 31 and 32 of TDA9815 respectively.
- *LIDK via pin 2 SAW filter FL94*
  L' is 'low', D9G8 conducts, D9G9 reverses, pin 6 of the L9F8 is short-circuited via C9T5. Therefore, the MF signal from the tuner is fed via pin 4 of L9F8 to pin 1 of FL93 (BG SAW filter) and pin 2 of FL94 (LIDK SAW filter). Because BG/LL'IMDK is 'low', D9G6 reverses and D9G7 conducts. As a result of this pins 5 and 4 of FL93 (BG SAW filter) are short-circuited and pins 5 and 4 of FL94 (LIDK SAW filter) are not short-circuited. Pins 5 and 4 of FL94 (LIDK SAW filter) are looped through to pins 32 and 31 of TDA9815 respectively.
- *L' via pin 1 SAW filter FL94*
  L' is 'high', D9G8 reverses, D9G9 conducts, pin 4 of the L9FB is short-circuited via C9T5. Therefore, the MF signal from the tuner is enabled via pin 6 of L9F8 to pin 1 input of FL94 (L' SAW filter). Because BG/LL'IMDK is 'low', pins 4 and 5 of FL94 are looped through to pins 31 and 32 of TDA9815 respectively.
- *M sound inter-carrier*
  In M mode the sound inter-carrier is processed, therefore the sound is extracted from the VIF information. Because the sound path is not used it is disabled by Q9F7.
- In order to filter the sound signal (SIF) from the picture the band reverse filters X9T0, X9T1, X9T2 and X9T3 are used. Pin 20 is the output, pin 18 the input for M sound and pin 17 the input for BGLL'IDK sound.
  Filter X9T1 (6.0 MHz) is switched off in the BG mode in order to prevent any NICAM BG carrier (5.85 MHz) from passing and filter X9T2 (6.5 MHz) is switched off in the I mode in order to prevent any NICAM I carrier (6.552 MHz) from passing.
- Pin 12 is the DW-MONO output. Via Q921 the de-emphasis for BGIDKM can be modified and additionally modified for M via Q922.

9.15.4 *MultiScreen with the PIPO*

In a set with the Video DualScreen module, Multi PIP is no longer created but MultiScreen is created with the aid of the PIPO SAB9077. In the MD2.2 the following configuration is selected:



For this the large picture is the main picture from the main tuner. The 8 small pictures are created by the Video DualScreen tuner. At the same time a scan or photofinish can be created with the 8 small pictures, for which the picture at the bottom right is the live picture.

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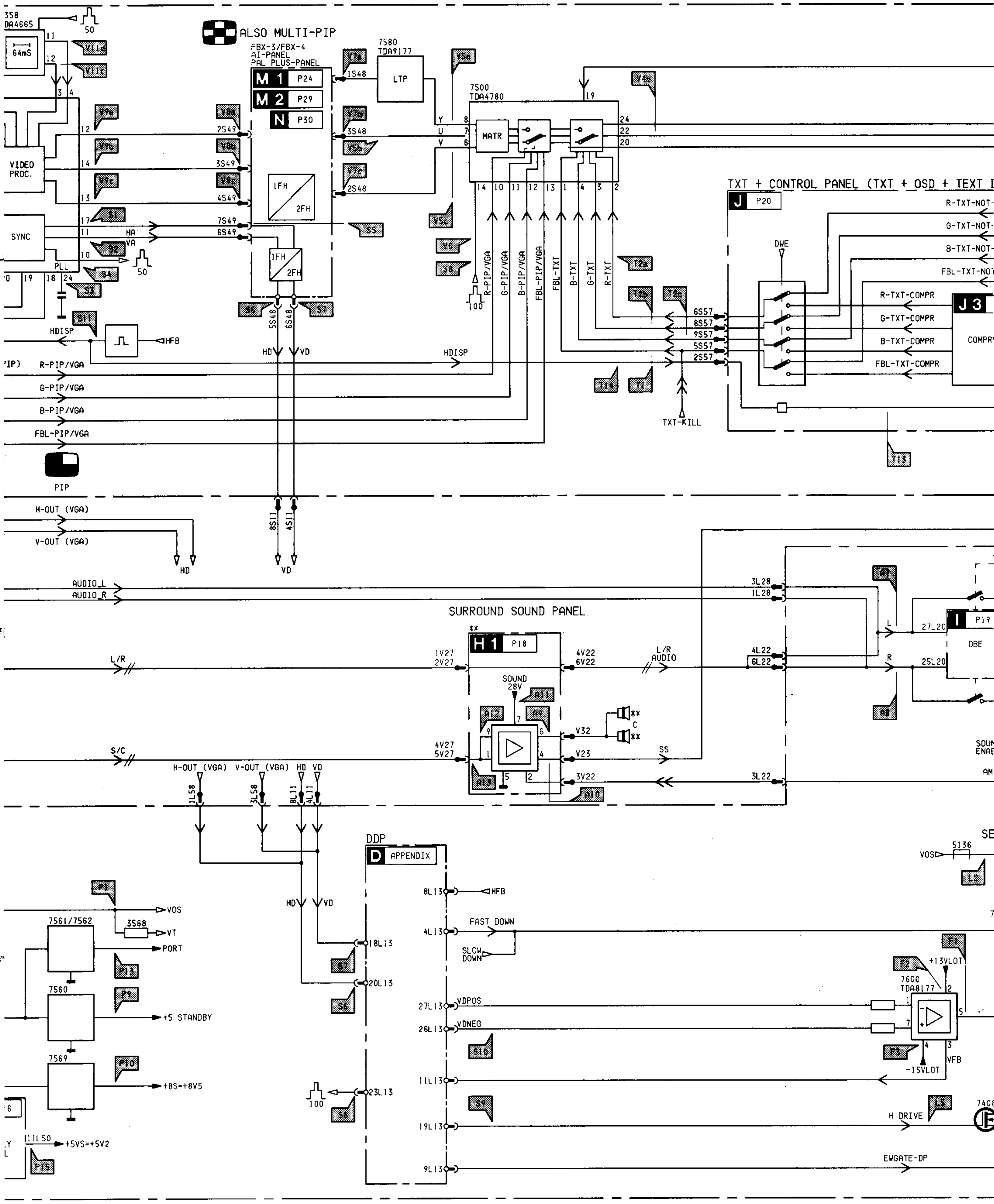
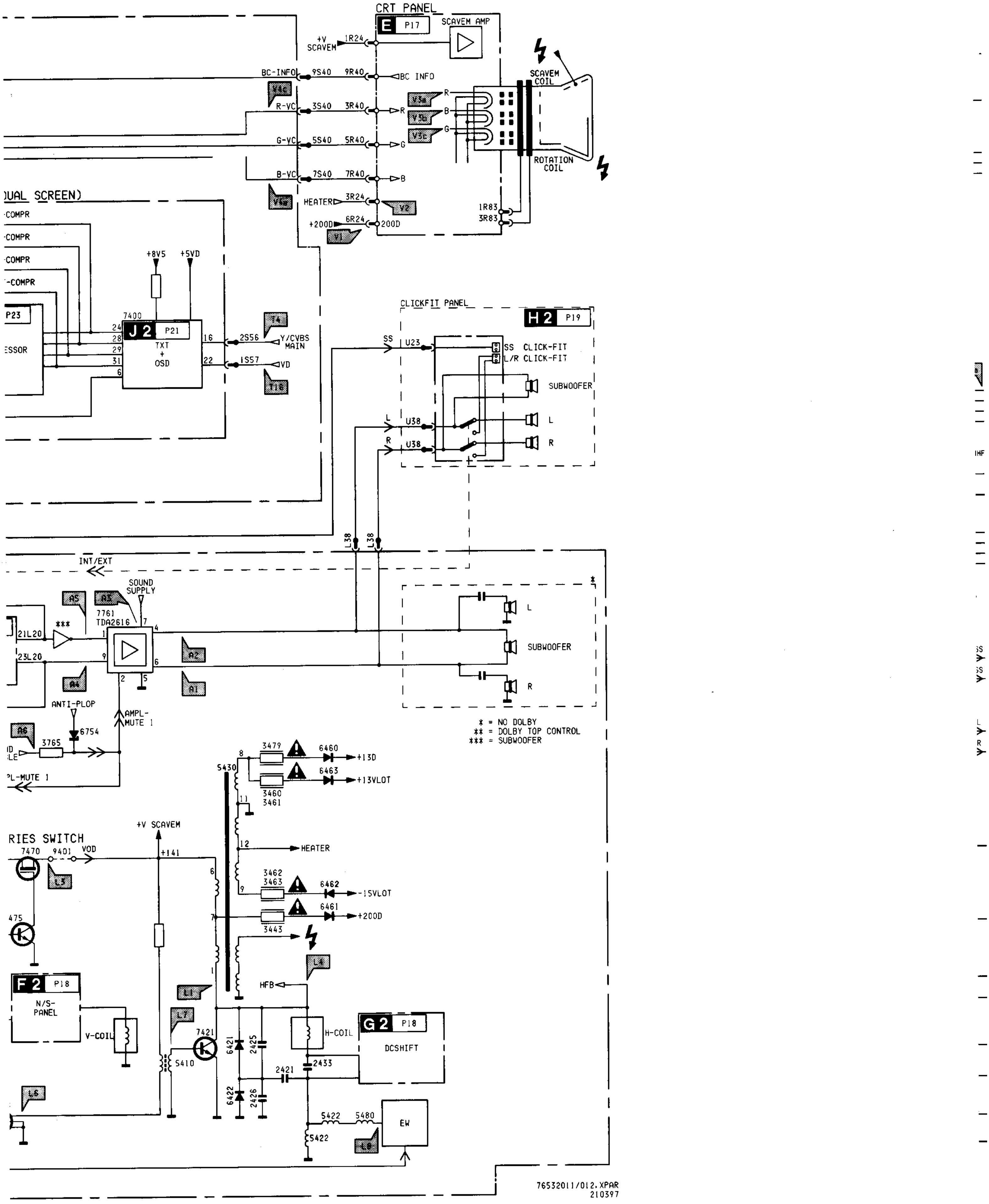
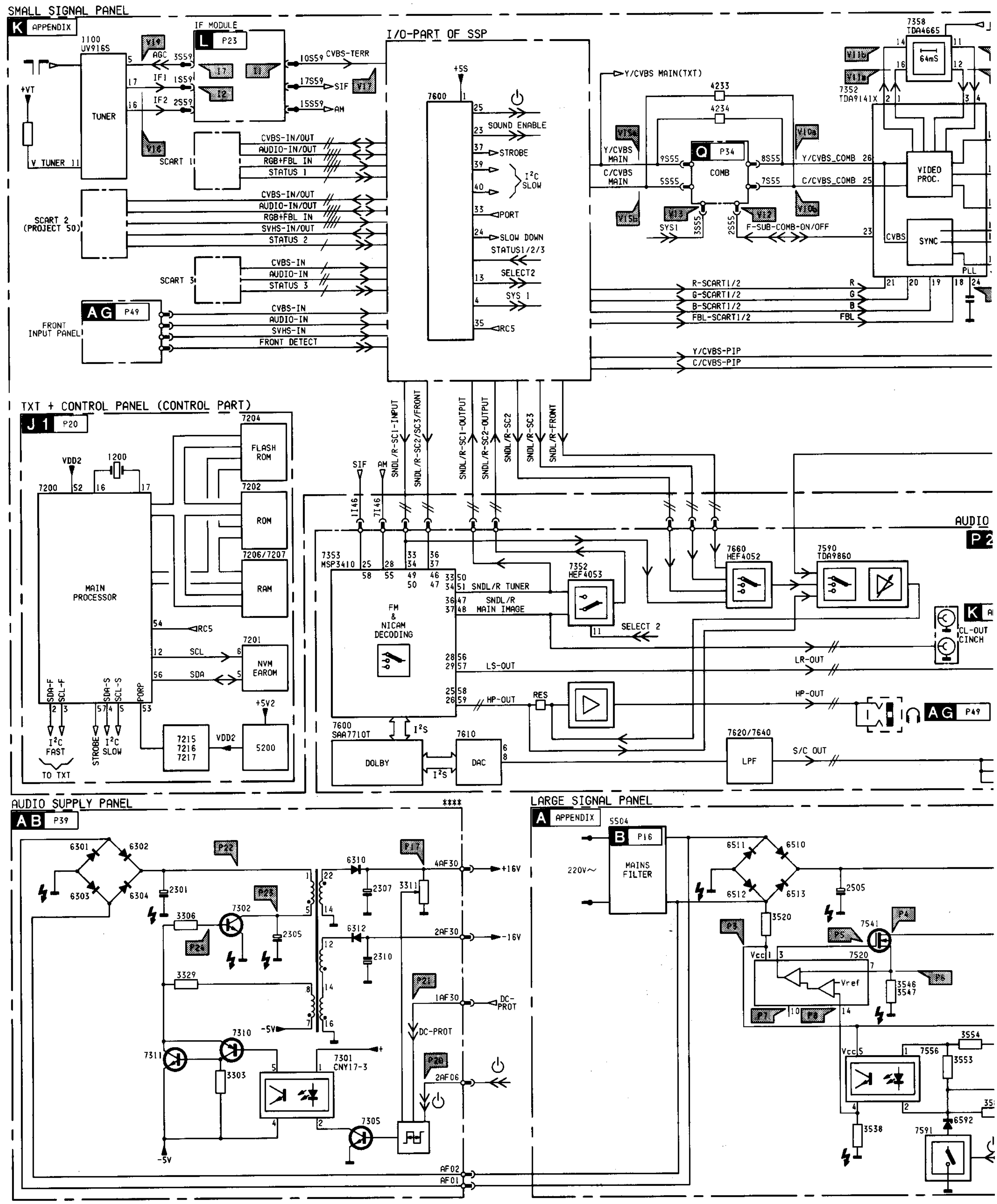

ALSO MULTI-PIP
FBX-3/FBX-4
AI-PANEL
PAL PLUS-PANEL
M 1 P24
M 2 P29
N P30
7580
TDA9177
LTP
7500
TDA4780
MATR
VIDEO PROC.
SYNC
64mS
1FH
2FH
HA
VA
PLL
HDISP
HFB
HD
VD
R-PIP/VGA
G-PIP/VGA
B-PIP/VGA
FBL-PIP/VGA
FBL-TXT
B-TXT
G-TXT
R-TXT
PIP
TXT + CONTROL PANEL (TXT + OSD + TEXT I
J P20
R-TXT-NOT
G-TXT-NOT
B-TXT-NOT
FBL-TXT-NOT
DWE
R-TXT-COMPR
G-TXT-COMPR
B-TXT-COMPR
FBL-TXT-COMPR
J 3
COMPR
TXT-KILL
H-OUT (VGA)
V-OUT (VGA)
AUDIO_L
AUDIO_R
SURROUND SOUND PANEL
H 1 P18
L/R
L/R AUDIO
SOUND 28V
S/C
SS
I P19
DBE
SOUND ENAB
AM
DDP
D APPENDIX
HFB
FAST DOWN
SLOW DOWN
VDPOS
VDNEG
H DRIVE
EWGATE-DP
7600
TDA8177
+13VLOT
-15VLOT
VFB
VOS
VT
PORT
7561/7562
3568
7560
+5 STANDBY
7569
+8S=+8V5
11L50
+5VS=+5V2
5136
SE
TDA4665

Diagramme synoptique version non Top-Dolby


CRT PANEL
E P17
SCAVEM AMP
+V SCAVEM
1R24
BC-INFO
9S40
9R40
BC INFO
SCAVEM COIL
R-VC
3S40
3R40
R
G-VC
5S40
5R40
G
B-VC
7S40
7R40
B
V4c
V3a
V3b
V3c
V4a
HEATER
3R24
V2
+200D
6R24
200D
V1
1R83
3R83
ROTATION COIL
DUAL SCREEN)
-COMPR
-COMPR
-COMPR
-COMPR
P23
ESSOR
+8V5
+5VD
7400
J 2 P21
TXT + OSD
24
28
29
31
6
16
22
2S56
1S57
Y/CVBS MAIN
VD
T4
T18
CLICKFIT PANEL
H 2 P19
SS
U23
SS CLICK-FIT
L/R CLICK-FIT
SUBWOOFER
L
U38
R
U38
L38
L38
INT/EXT
SOUND SUPPLY
A5
A3
7761
TDA2616
***
21L20
23L20
1
9
7
4
6
2
5
A2
A1
A4
ANTI-PLOP
6754
AMPL-MUTE 1
A6
3765
ID
LE
PL-MUTE 1
L
SUBWOOFER
R
* = NO DOLBY
** = DOLBY TOP CONTROL
*** = SUBWOOFER
8
3479
6460
+13D
S430
6463
+13VLOT
3460
3461
11
12
HEATER
RIES SWITCH
+V SCAVEM
7470
9401
VOD
+141
L3
6
3462
3463
9
6462
-15VLOT
475
7
6461
+200D
3443
1
L4
HFB
F 2 P18
N/S-PANEL
V-COIL
L1
L7
7421
6421
2425
H-COIL
G 2 P18
DCSHIFT
S410
2433
2421
6422
2426
L6
5422
5480
S422
EW
L8
76532011/012.XPAR
210397
IHF
SS
SS
L
R

Block diagram Top-Dolby version (front control styling) /



SMALL SIGNAL PANEL
K APPENDIX
1100 UV916S
TUNER
+VT
V TUNER 11
AGC
IF1
IF2
3S59
1S59
2S59
IF MODULE
L P23
10S59 CVBS-TERR
17S59 SIF
15S59 AM
SCART 1
SCART 2 (PROJECT 50)
SCART 3
CVBS-IN/OUT
AUDIO-IN/OUT
RGB+FBL IN
STATUS 1
SVHS-IN/OUT
STATUS 2
CVBS-IN
AUDIO-IN
STATUS 3
AG P49
FRONT INPUT PANEL
SVHS-IN
FRONT DETECT
I/O-PART OF SSP
+5S
7600
SOUND ENABLE
STROBE
I²C SLOW
PORT
SLOW DOWN
STATUS1/2/3
SELECT2
SYS 1
RC5
Y/CVBS MAIN(TXT)
4233
4234
Y/CVBS MAIN
C/CVBS MAIN
9S55
5S55
Q P34
COMB
8S55
7S55
3S55
2S55
SYS1
F-SUB-COMB-ON/OFF
Y/CVBS_COMB
C/CVBS_COMB
7358 TDA4665
64mS
7352 TDA9141X
VIDEO PROC.
CVBS
SYNC
PLL
R-SCART1/2
G-SCART1/2
B-SCART1/2
FBL-SCART1/2
Y/CVBS-PIP
C/CVBS-PIP
TXT + CONTROL PANEL (CONTROL PART)
J1 P20
7204 FLASH ROM
7202 ROM
7206/7207 RAM
VDD2
1200
7200
MAIN PROCESSOR
RC5
SCL
SDA
7201 NVM EAROM
SDA-F
SCL-F
SDA-S
SCL-S
PORP
I²C FAST
TO TXT
STROBE
I²C SLOW
7215 7216 7217
VDD2
+5V2
5200
SIF
AM
SNDL/R-SC1-INPUT
SNDL/R-SC2/SC3/FRONT
SNDL/R-SC1-OUTPUT
SNDL/R-SC2-OUTPUT
SNDL/R-SC2
SNDL/R-SC3
SNDL/R-FRONT
1I46
7I46
7353 MSP3410
FM & NICAM DECODING
SNDL/R TUNER
SNDL/R MAIN IMAGE
7352 HEF4053
SELECT 2
7660 HEF4052
7590 TDA9860
AUDIO
P2
K
CL-OUT CINCH
LR-OUT
LS-OUT
HP-OUT
RES
AG P49
7600 SAA7710T
I²S
DOLBY
7610 DAC
7620/7640 LPF
S/C OUT
AUDIO SUPPLY PANEL
AB P39
6301
6302
6303
6304
2301
3306
7302
2305
3329
6310
2307
3311
4AF30
+16V
6312
2310
2AF30
-16V
1AF30
DC-PROT
-5V
7310
7311
3303
7301 CNY17-3
7305
2AF06
AF02
AF01
-5V
LARGE SIGNAL PANEL
A APPENDIX
5504
B P16
MAINS FILTER
220V~
6511
6510
6512
6513
2505
3520
7541
7520
Vcc
Vref
3546 3547
3554
7556
3553
3538
6592
7591

Blockschaltbild der Top-Dolby-Version /

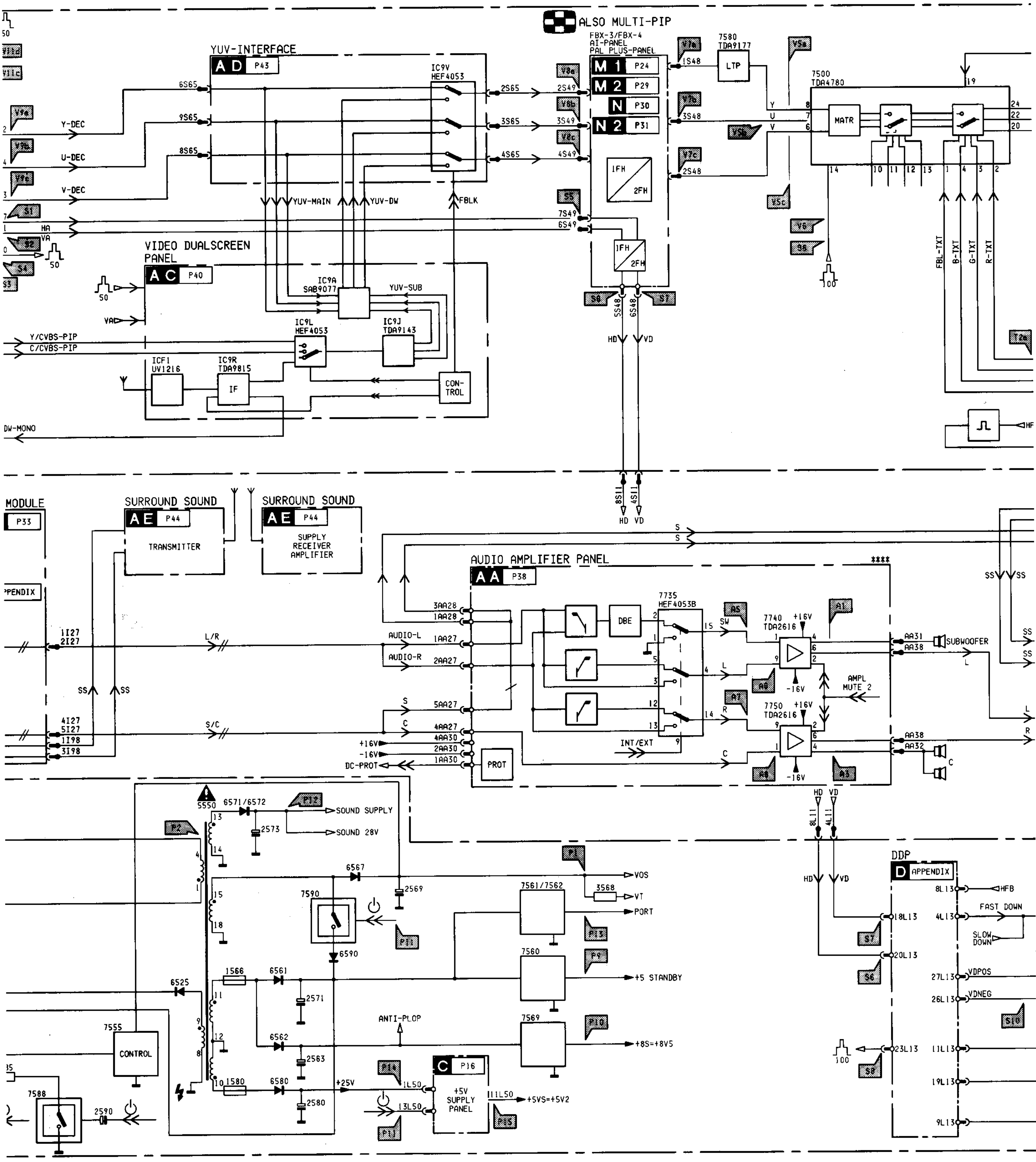
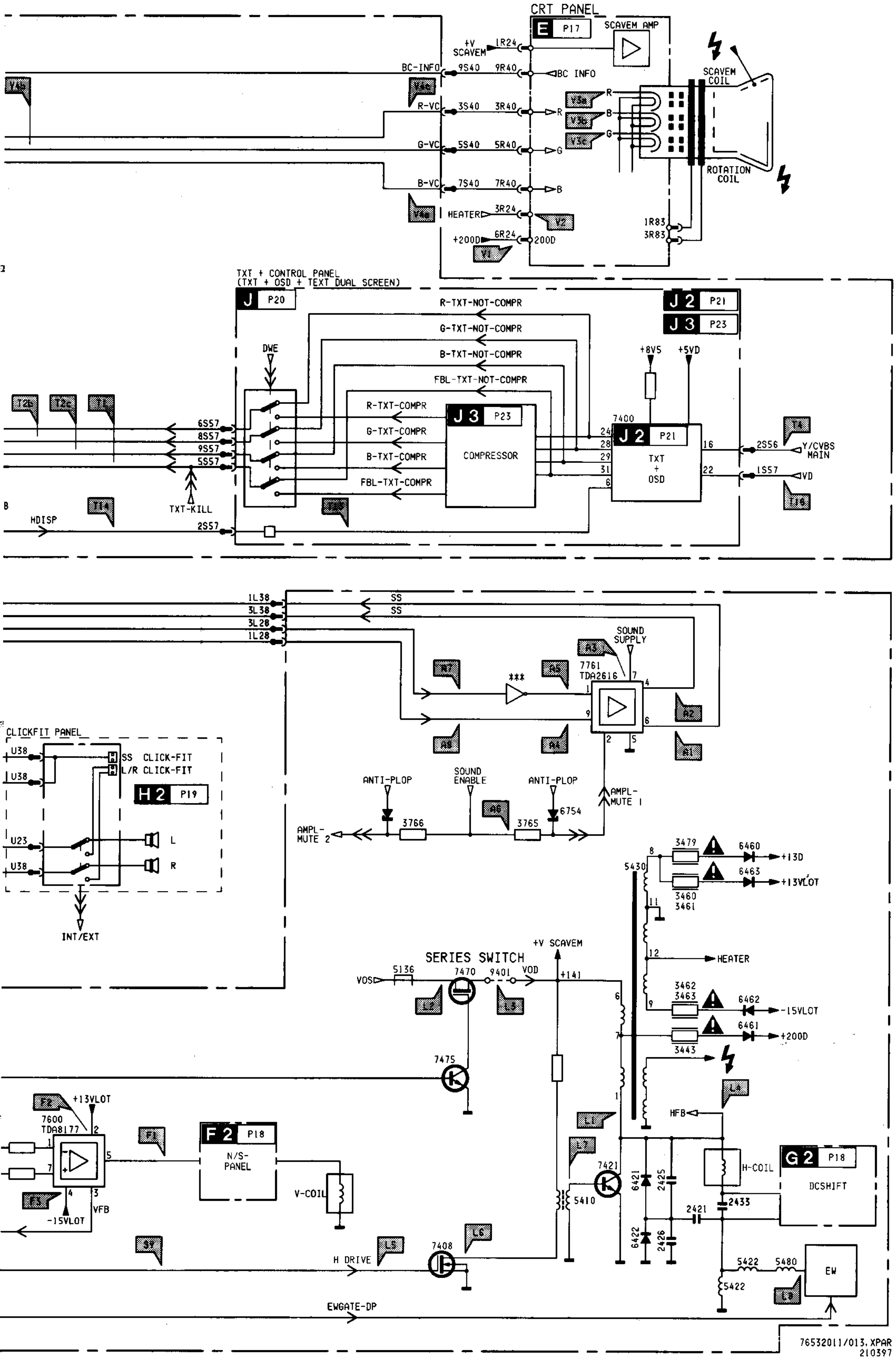

ALSO MULTI-PIP
YUV-INTERFACE
AD P43
IC9V HEF4053
FBX-3/FBX-4
AI-PANEL
PAL PLUS-PANEL
M1 P24
M2 P29
N P30
N2 P31
1FH
2FH
7580 TDA9177
LTP
7500 TDA4780
MATR
Y-DEC
U-DEC
V-DEC
HA
VA
YUV-MAIN
YUV-DW
FBLK
VIDEO DUALSCREEN PANEL
AC P40
IC9A SAB9077
YUV-SUB
IC9L HEF4053
IC9J TDA9143
Y/CVBS-PIP
C/CVBS-PIP
ICF1 UV1216
IC9R TDA9815
IF
CON-TROL
DW-MONO
FBL-TXT
B-TXT
G-TXT
R-TXT
HD
VD
MODULE
P33
APPENDIX
SURROUND SOUND
AE P44
TRANSMITTER
SUPPLY RECEIVER AMPLIFIER
AUDIO AMPLIFIER PANEL
AA P38
DBE
7735 HEF4053B
7740 TDA2616
7750 TDA2616
AUDIO-L
AUDIO-R
L/R
S/C
SS
+16V
-16V
DC-PROT
PROT
INT/EXT
AMPL MUTE 2
SUBWOOFER
5550
6571/6572
SOUND SUPPLY
SOUND 28V
2573
6567
2569
VOS
3568
VT
7590
7561/7562
PORT
6590
1566
6561
2571
7560
+5 STANDBY
6525
ANTI-PLOP
6562
2563
7569
+8S=+8V5
7555
CONTROL
1580
6580
+25V
2580
C P16
+5V SUPPLY PANEL
+5VS=+5V2
7588
2590
DDP
D APPENDIX
HFB
FAST DOWN
SLOW DOWN
VDPOS
VDNEG

Diagramme synoptique de la version Top-Dolby


CRT PANEL
E P17
SCAVEM AMP
+V SCAVEM
1R24
BC-INFO
9S40
9R40
BC INFO
SCAVEM COIL
R-VC
3S40
3R40
R
G-VC
5S40
5R40
G
B-VC
7S40
7R40
B
ROTATION COIL
HEATER
3R24
+200D
6R24
200D
1R83
3R83
TXT + CONTROL PANEL
(TXT + OSD + TEXT DUAL SCREEN)
J P20
J 2 P21
J 3 P23
R-TXT-NOT-COMPR
G-TXT-NOT-COMPR
B-TXT-NOT-COMPR
FBL-TXT-NOT-COMPR
DWE
R-TXT-COMPR
G-TXT-COMPR
B-TXT-COMPR
FBL-TXT-COMPR
COMPRESSOR
+8VS
+5VD
7400
TXT + OSD
6S57
8S57
9S57
5S57
TXT-KILL
HDISP
2S57
2S56
Y/CVBS MAIN
1S57
VD
1L38
3L38
3L28
1L28
SS
SOUND SUPPLY
7761
TDA2616
***
ANTI-PLOP
SOUND ENABLE
3766
3765
6754
AMPL-MUTE 1
AMPL-MUTE 2
CLICKFIT PANEL
U38
U23
SS CLICK-FIT
L/R CLICK-FIT
H 2 P19
L
R
INT/EXT
3479
6460
+13D
6463
+13VLOT
5430
3460
3461
HEATER
3462
3463
6462
-15VLOT
6461
+200D
3443
SERIES SWITCH
+V SCAVEM
5136
7470
9401
VOD
VOS
+141
7475
HFB
+13VLOT
7600
TDA8177
F 2 P18
N/S-PANEL
V-COIL
-15VLOT
VFB
7421
6421
2425
2426
6422
H-COIL
2433
2421
G 2 P18
DCSHIFT
5410
7408
H DRIVE
5422
5480
EW
EWGATE-DP
76532011/013.XPAR
210397

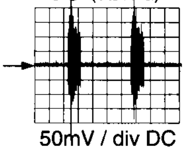
002	K6	7480	D4	3523	I9	5567	F6	9427	I5	9618	D3	2596	D7
003	D3	7507	M9	3525	I9	5572	F7	9428	H3	9619	A4	2601	B1
004	B8	7520	I9	3526	I9	5573	D10	9429	H4	9620	A2	2609	C5
005	F7	7541	J7	3527	I9	5617	E2	9431	H2	9621	C2	2612	D1
1503	N7	7556	H10	3529	K8	5701	B8	9432	I2	9622	D2	2613	D1
2400	G4	7560	E9	3530	J10	6409	N3	9433	H3	9624	A4	2614	D2
2418	L5	7569	B9	3531	K9	6410	N4	9435	G2	9749	A9	2615	C3
2419	K5	7590	E7	3532	L10	6411	N5	9436	I2	9750	B6	2616	D1
2420	K5	7600	D1	3533	K10	6425	I3	9440	K4	9751	A8	2617	E1
2421	G3	7761	B6	3534	K10	6426	I3	9441	K4	9752	A8	2618	D2
2422	F3	L01	N8	3535	I10	6441	L2	9442	C2	9753	B10	2620	E2
2425	J4	L02	M10	3536	I10	6451	B4	9443	C3	9754	A9	2630	B5
2426	H5	L04	M7	3537	I10	6452	C3	9444	F1	9755	A8	2750	C8
2428	I4	L06	C10	3538	H10	6453	M3	9445	H3	9756	A8	2751	A10
2432	H3	L07	D10	3539	I10	6454	M3	9446	H3	9758	N7	2752	A10
2433	H3	L10	E10	3541	J7	6460	J1	9447	E3	9759	A9	2753	B6
2434	H5	L11	A5	3546	K7	6462	G2	9450	M3	9760	B8	2754	C7
2442	L2	L13	A4	3547	K7	6463	G2	9451	I2	9761	B10	2756	A6
2450	M2	L15	A3	3548	I9	6465	G4	9453	J1	9762	B8	2761	B6
2452	M2	L17	L4	3549	H9	6466	M2	9456	H2	9767	N7	2762	B7
2453	M2	L20	C8	3550	H9	6471	G5	9458	L1	9781	B6	2763	B7
2466	F2	L22	A9	3551	H9	6479	D4	9460	I2	9782	D8	2776	A6
2478	E5	L24	M1	3552	K10	6480	C4	9461	H2	9786	B10	2778	A7
2505	L8	L25	C1	3553	F9	6481	C4	9462	H1	1440	E2	2787	B7
2506	M10	L28	B10	3554	E9	6482	D4	9463	F2	1566	G8	2788	A6
2509	M9	L38	A8	3555	F10	6483	E3	9465	B4	1572	G8	3401	F4
2540	K7	L39	A8	3556	G10	6506	M9	9466	C4	1580	G8	3402	F4
2542	I7	L50	E8	3557	G10	6507	J8	9470	G5	2401	F4	3443	L1
2543	J7	L58	A1	3558	G10	6508	M9	9471	F6	2402	N3	3460	H2
2544	J7	L91	H3	3560	F9	6509	L9	9472	B5	2409	A4	3461	G2
2550	H9	L93	H4	3561	F9	6510	M7	9473	B5	2410	M3	3462	H1
2561	D8	2504	L7	3562	G6	6511	M6	9475	B5	2411	N4	3463	H1
2563	F7	2531	J10	3563	E9	6512	M8	9476	F4	2412	N4	3479	J2
2566	D8	3407	N3	3564	C7	6513	M8	9477	H4	2413	N4	3502	I8
2567	G6	3409	N2	3565	E9	6514	L9	9478	E4	2417	M5	3513	M9
2568	G6	3411	M4	3566	E9	6515	K9	9479	E5	2424	I3	3524	K8
2569	H6	3412	M4	3568	E10	6516	K9	9481	E3	2431	I4	3543	I8
2573	E6	3413	N3	3569	E9	6518	I9	9482	D4	2435	H3	3559	F10
2580	F8	3414	B4	3570	G7	6524	K9	9508	J8	2440	L2	3609	C5
2755	C7	3416	N2	3571	D9	6525	J8	9509	F10	2448	C4	3617	F1
2765	A7	3417	M4	3572	F9	6540	K7	9510	D9	2457	C4	3622	B2
2766	B8	3418	M4	3579	J10	6541	K7	9520	I10	2460	J1	3752	A6
2767	A7	3419	J5	3582	D9	6542	I7	9522	K8	2461	I1	3753	C6
2768	B8	3425	H5	3583	D7	6545	J6	9523	K8	2462	F2	7408	N4
3400	G3	3426	H4	3584	F9	6548	I8	9525	I9	2463	G2	7409	N3
3408	N5	3430	J4	3585	F9	6550	G10	9526	I9	2465	G1	7512	L8
3410	N5	3431	J4	3586	F9	6560	F8	9530	J10	2467	E5	7513	L9
3415	N1	3434	I3	3587	F9	6561	F8	9536	H9	2468	G5	7514	L9
3423	I5	3435	I3	3588	E9	6563	D8	9537	H10	2480	E4	7515	L10
3453	M3	3448	B4	3589	E7	6564	A6	9543	F7	2481	C4	7555	G10
3478	L1	3449	C3	3592	G9	6566	K7	9544	H9	2482	C5	7561	E9
3503	M6	3450	M1	3593	E6	6569	C10	9545	I7	2503	J8	7562	E10
3505	M6	3451	M2	3594	D7	6576	D8	9551	G8	2507	J8	7588	E10
3506	N9	3452	M2	3595	D7	6577	E7	9552	H9	2508	L9	7589	F9
3507	N10	3457	B4	3596	D9	6581	F8	9557	F6	2511	M7	7591	G9
3528	M9	3458	C4	3597	G9	6590	E6	9560	D10	2512	M8	7592	D6
3544	I7	3459	M3	3598	F9	6591	D7	9561	F6	2513	L9	7770	C8
3545	K6	3465	B5	3599	E6	6592	G9	9562	E7	2514	K9		
3567	F6	3466	C5	3601	C1	6614	E2	9563	D10	2521	J9		
3573	D6	3467	D5	3602	C1	6617	C2	9564	G6	2522	J9		
3574	D6	3468	G5	3603	C1	6618	C2	9565	D9	2524	I9		
3575	C6	3469	L1	3610	C2	6620	E2	9569	C10	2525	I8		
3590	E6	3470	F5	3611	C1	6753	B9	9571	F6	2526	H8		
5400	G5	3471	F5	3612	B2	6754	C9	9572	F7	2527	I8		
5401	G4	3472	D5	3613	B3	6755	C8	9573	D6	2528	J9		
5402	H6	3473	D5	3614	B3	6756	C9	9574	D6	2533	K10		
5410	M4	3474	B5	3618	B1	6757	B9	9575	D10	2534	J10		
5411	M5	3475	E5	3619	B1	6770	C9	9576	D9	2535	I10		
5421	I4	3476	F5	3620	F1	9400	F3	9577	D10	2538	H10		
5422	E3	3477	D5	3750	C6	9401	G4	9578	D9	2541	K8		
5423	I5	3480	C4	3751	C6	9402	F1	9579	E7	2545	J6		
5424	F3	3481	C4	3755	A7	9403	C2	9581	J9	2548	H9		
5430	K3	3482	E2	3760	B6	9405	F2	9585	F9	2554	G10		
5460	I2	3483	C3	3761	B6	9406	C2	9592	G8	2555	G10		
5461	H2	3484	C3	3762	B7	9407	F2	9597	D9	2557	G10		
5462	H1	3485	D4	3763	C7	9408	M5	9600	E1	2559	C10		
5480	D3	3486	D4	3764	B7	9409	J2	9601	B3	2560	F8		
5507	M9	3487	B4	3765	C8	9410	N5	9602	B3	2562	H6		
5550	H7	3488	C5	3766	B9	9411	H4	9603	A5	2564	E8		
5750	C6	3489	E3	3770	C8	9412	D5	9604	B2	2565	C10		
5751	C6	3508	L9	3771	C8	9413	A2	9605	B2	2570	G7		
6419	L5	3509	L10	3772	C8	9414	A2	9606	B4	2571	E9		
6421	I5	3510	J8	5418	L5	9415	D4	9607	B4	2572	F7		
6422	H5	3512	K9	5419	L5	9417	M5	9608	B5	2574	E9		
6562	F8	3514	L10	5425	H5	9419	L5	9609	C2	2575	D6		
6567	G6	3515	K10	5426	L5	9420	I4	9610	A2	2581	F9		
6571	F7	3516	K10	5525	I8	9421	K4	9611	E4	2584	F10		
6572	F7	3517	L9	5542	J7	9422	H6	9612	D1	2590	F10		
6573	E6	3518	I9	5543	F7	9423	H5	9613	C1	2591	F10		
7421	L5	3519	K10	5544	I7	9424	H4	9615	A3	2592	D6		
7470	F5	3521	J9	5545	I6	9425	H5	9616	B3	2593	F6		
7475	E4	3522	K8	5561	D8	9426	L5	9617	A3	2594	F7		

POWER SUPPLY

P1 ⦶ (VOS)
140V DC

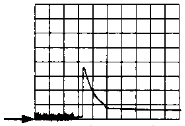
P1 ⏻ (VOS)
0V DC

P6 ⏻ (DEMAG)



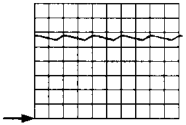
50mV / div DC
0.1s / div

P13 ON-OFF (PORT)



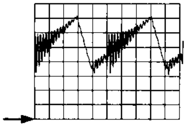
1V / div DC
1s / div

P2 ⦶ (300V)



50V / div DC
5ms / div

P7 ⦶ (OSCILLATOR)



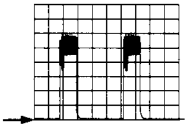
0.5V / div DC
5µs / div

P14 ⦶ (+25V)
27V5 DC

P2 ⏻
300V DC

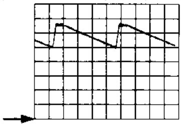
P3 ⦶ (Vcc IC7520)
14V DC

P7 ⏻ (OSCILLATOR)



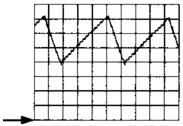
0.5V / div DC
0.1s / div

P14 ⏻ (+25V)



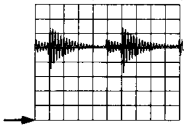
0.5V / div DC
20ms / div

P3 ⏻ (Vcc IC7520)



2V / div DC
20ms / div

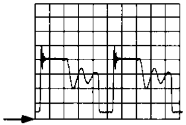
P8 ⦶ (FEEDBACK)



0.5V / div DC
5µs / div

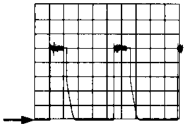
P15 ⦶ (+5S)
25V DC

P4 ⦶ (DRAIN TS7541)



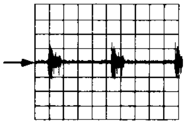
100V / div DC
5µs / div

P8 ⏻ (FEEDBACK)



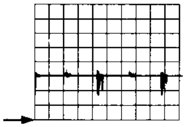
0.5V / div DC
20ms / div

P15 ⏻ (+5S)



20mV / div DC
20ms / div

P4 ⏻ (DRAIN TS7541)



100V / div DC
0.1s / div

P9 ⦶ (+5V STANDBY)
4V9 DC

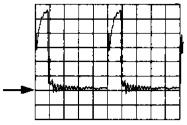
P9 ⏻ (+5V STANDBY)
4V9 DC

P10 ⦶ (+8S)
8V6 DC

P10 ⏻ (+8S)
0V DC

HORIZONTAL (LINE)

P5 ⦶ (DRIVE)



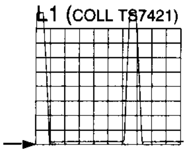
2V / div DC
5µs / div

P11 ⦶ (STANDBY)
3V9 DC

P11 ⏻ (STANDBY)
0V1 DC

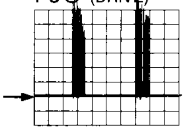
P12 ⦶ (SOUND-SUP.)
29V5 DC

L1 (COLL TS7421)



100V / div DC
5µs / div

P5 ⏻ (DRIVE)



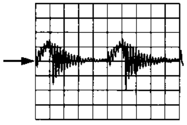
0.5V / div DC
0.1s / div

P12 ⏻ (SOUND-SUP.)
3V DC

L2
(TS7470 series switch)
140V9 DC

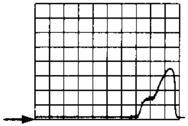
L3
(TS7470 series switch)
140V4 DC

P6 ⦶ (DEMAG)



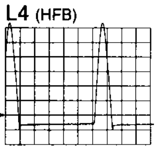
0.5V / div DC
5µs / div

P13 OFF-ON (PORT)



1V / div DC
20ms / div

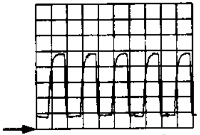
L4 (HFB)



5V / div DC
5µs / div

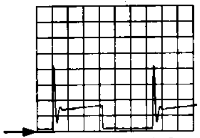
Overview oscillograms / Übersicht der Oszillogramme /

L5 (HDRIVE)



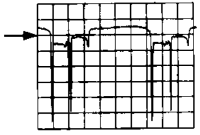
1V / div DC
5 µs / div

L6



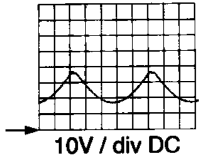
50V / div DC
5µs / div

L7 (BASE TS7421)



2V / div DC
5µs / div

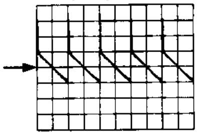
L8 (EWD)



10V / div DC
2ms / div

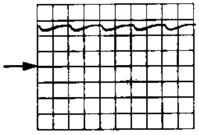
VERTICAL (FRAME)

F1 (LV+)



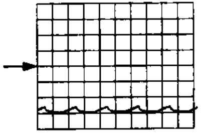
10V / div DC
5ms / div

F2 (+13V-LOT)



5V / div DC
5ms / div

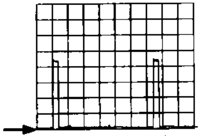
F3 (-15V-LOT)



5V / div DC
5ms / div

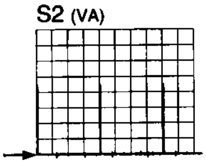
SYNCHRONISATION

S1 (HA)



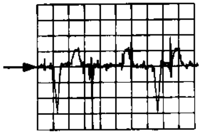
1V / div DC
10µs / div

S2 (VA)



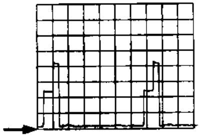
1V / div DC
5µs / div

S3 (PLL)



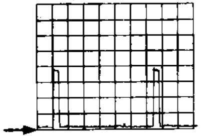
50mV / div AC
10µs / div

S4(SC_1FH)



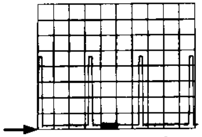
1V / div DC
10µs / div

S5 (HA)



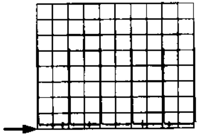
1V / div DC
10µs / div

S6 (HD)



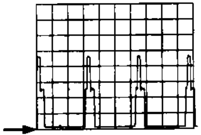
1V / div DC
10µs / div

S7 (VD)



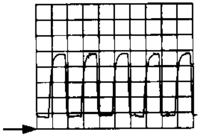
1V / div DC
5ms / div

S8 (SC_2FH)



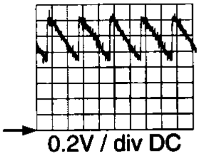
1V / div DC
10µs / div

S9 (HDRIVE)



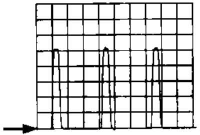
1V / div DC
5 µs / div

S10 (VDNEG)



0.2V / div DC
5ms / div

S11 (HDISP)

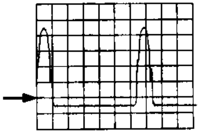


1V / div DC
10µs / div

VIDEO

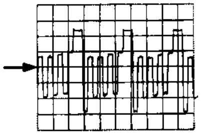
V1 (+200D)
200V DC

V2 (HEATER)



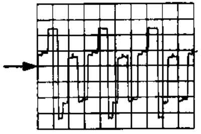
5V / div DC
5µs / div

V3a (RGB cathodes)



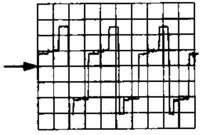
20V / div AC
10µs / div

V3b (RGB cathodes)



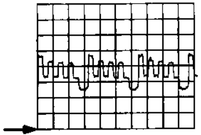
20V / div AC
10µs / div

V3c (RGB cathodes)



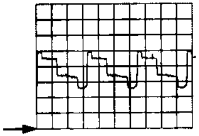
20V / div AC
10µs / div

V4a (RGB IC7500)



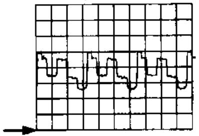
1V / div DC
10µs / div

V4b (RGB IC7500)



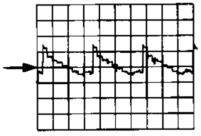
1V / div DC
10µs / div

V4c (RGB IC7500)



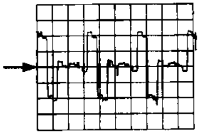
1V / div DC
10µs / div

V5a (YUV IC7500)



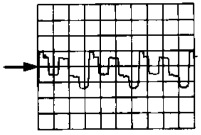
0.2V / div AC
10µs / div

V5b (YUV IC7500)



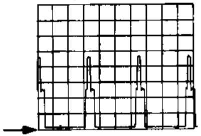
0.2V / div AC
10µs / div

V5c (YUV IC7500)



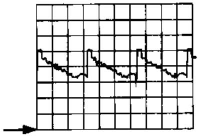
0.2V / div AC
10µs / div

V6 (SC_2FH)



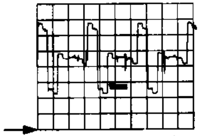
1V / div DC
10µs / div

V7a (YUV FBX)



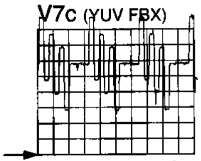
0.2V / div DC
10µs / div

V7b (YUV FBX)



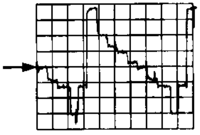
0.2V / div DC
10µs / div

V7c (YUV FBX)



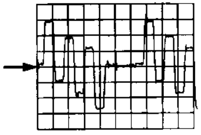
0.2V / div AC
10µs / div

V8a (YUV DEC)



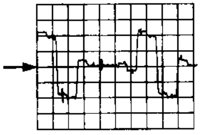
0.2V / div AC
10µs / div

V8b (YUV DEC)



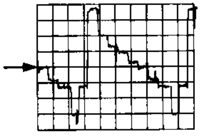
0.2V / div AC
10µs / div

V8c (YUV DEC)



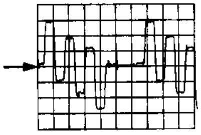
0.2V / div AC
10µs / div

V9a (YUV DEC)



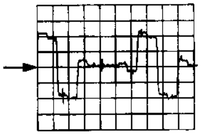
0.2V / div AC
10µs / div

V9b (YUV DEC)



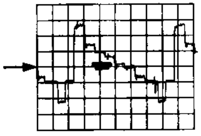
0.2V / div AC
10µs / div

V9c (YUV DEC)



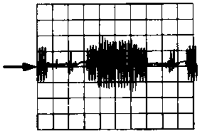
0.2V / div AC
10µs / div

V10a (Y/CVBS_COMB)



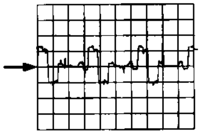
0.2V / div AC
10µs / div

V10b (C/CVBS_COMB)



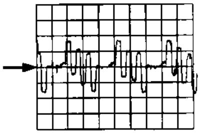
0.2V / div DC
10µs / div

V11a -(R-Y)



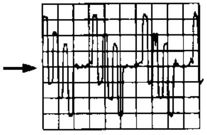
0.2V / div AC
20µs / div

V11b -(B-Y)



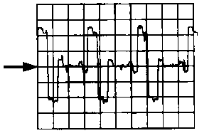
0.2V / div AC
20µs / div

V11c -(U)



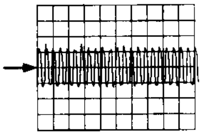
0.2V / div AC
20µs / div

V11d -(V)



0.2V / div AC
20µs / div

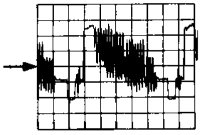
V12 (FSUB_COMB ON/OFF)



0.1V / div AC
0.5µs / div

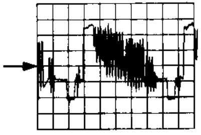
V13 (SYS 1)
PAL BG = 0V
NTSC M = 5V

V15a (Y/CVBS_MAIN)



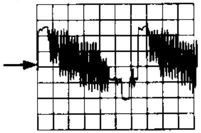
0.2V / div AC
10µs / div

V15b (C/CVBS_MAIN)



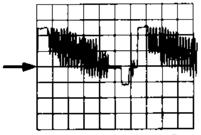
0.2V / div AC
10µs / div

V16 (CVBS)



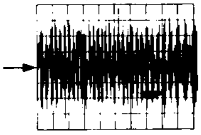
0.2V / div AC
10µs / div

V17 (CVBS_TERR)



0.5V / div DC
10µs / div

V18 (IF1)

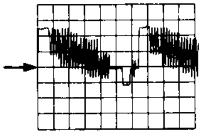


50mV / div DC
50µs / div

V19 (AGC)
1V9 DC

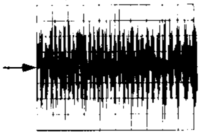
IF

I1 (CVBS_TERR)



0.5V / div DC
10µs / div

I2 (IF1)

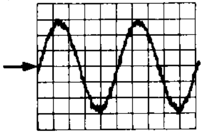


50mV / div DC
50µs / div

I7 (AGC)
1V9 DC

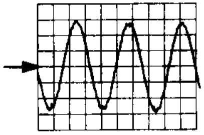
AUDIO

A1 (AUDIO AMP. OUT R)
-1KHz right (incr.volume)



0V2 / div AC
0.1ms / div

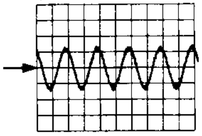
A2(AUDIO AMP. OUT L)
-3KHz left (incr.volume)



0V2 / div AC
0.2ms / div

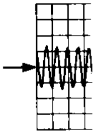
A3 (SOUND_SUP)
29V5 DC

A4 (R_INPUT) -1KHz
(volume level increased)



0V2 / div AC
0.5ms / div

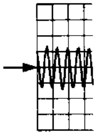
A5 (L
(volum



50m
0.5

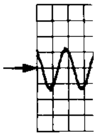
A6 (S
MUT
MUT
A11 (
27V

A7 (A
(volum



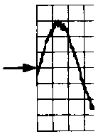
50m
0.5

A8 (A
(volum



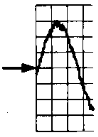
0V2
0.5

A9 (AU
-1KHz r



0V2
0.1

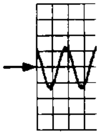
A10 (
-1KHz r



0V2
0.1

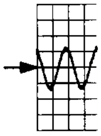
A11 (
27V

A12 (
(volume



0V2
0.5

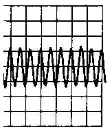
A13 (
(volume



0V2
0.5

Vue d'ensemble des oscillogrammes

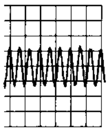
INPUT) -3KHz
level increased)



/ / div AC
ms / div

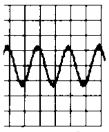
UND ENABLE)
= 0V
= 29V
SOUND 28V)
5 DC

JDIO-L/S) -3KHz
level increased)



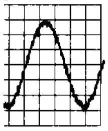
/ / div AC
ms / div

JDIO_R/S) -1KHz
level increased)



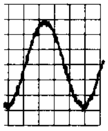
/ div AC
ms / div

DIO AMP. CENTER)
ght (incr.volume)



/ div AC
ns / div

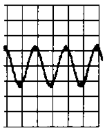
UDIO AMP. SURR.)
ight (incr.volume)



/ div AC
ns / div

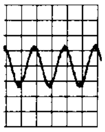
SOUND 28V)
5 DC

_DAC) -1KHz
level increased)



/ div AC
ns / div

_DAC) -1KHz
level increased)

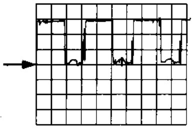


/ div AC
ns / div

TELETEXT
(MEASURED
IN TXT-MODE)

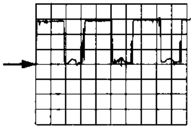
T1 (FBL_TXT)
TXT = 2V2 DC
NO TXT = 0V DC

T2a (R_TXT)



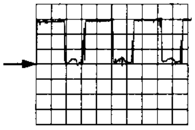
0.2V / div DC
10µs / div

T2b (G_TXT)



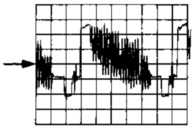
0.2V / div DC
10µs / div

T2c (B_TXT)



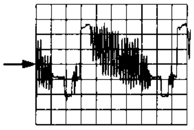
0.2V / div DC
10µs / div

T3 (CVBS)



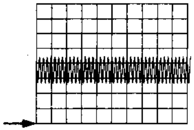
0.2V / div AC
10µs / div

T4 (Y/CVBS_MAIN)



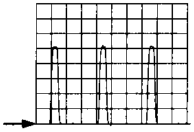
0.2V / div AC
10µs / div

T13 (pin 6 IC7400)



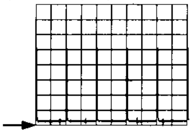
1V / div DC
0.2µs / div

T14 (HDISP)



1V / div DC
10µs / div

T16 (VD)

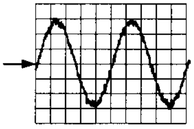


1V / div DC
5ms / div

→ = 0V

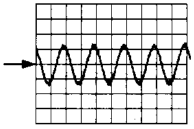
OSC_BLK1.AI
250297

A1 (AUDIO AMP-OUT SW)
-1KHz right (incr.volume)



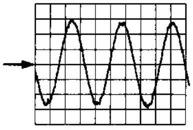
0V2 / div AC
0.1ms / div

A7 (C) -1KHz
(volume level increased)



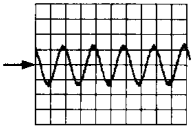
50mV / div AC
0.5ms / div

A2 (AUDIO AMP-OUT L)
-3KHz left (incr.volume)



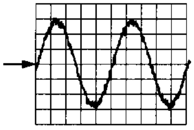
0V2 / div AC
0.1ms / div

A8 (R) -1KHz
(volume level increased)



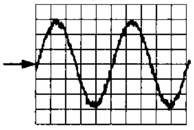
50mV / div AC
0.5ms / div

A3 (AUDIO AMP-OUT L)
-1KHz right (incr.volume)



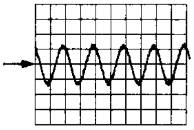
0V2 / div AC
0.2ms / div

A4 (AUDIO AMP-OUT R)
-1KHz right (incr.volume)



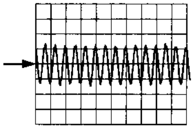
0V2 / div AC
0.1ms / div

A5 (SW) -1KHz
(volume level increased)



50mV / div AC
0.5ms / div

A6 (L) -3KHz
(volume level increased)



50mV / div AC
0.5ms / div

P17 ⏼ (+16V)
+16V DC
P17 ⏻ (+16V)
0V
P18 ⏼ (-16V)
-16V DC
P18 ⏻ (-16V)
0V

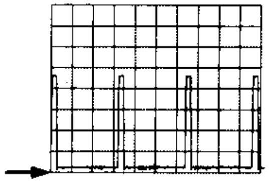
P19 ⏼ (+5 STANDBY)
4V8
P19 ⏻ (+5 STANDBY)
4V8
P20 ⏼ (AMP. MUTE 2)
MUTE 2V5
P20 ⏻ (AMP. MUTE 2)
NO MUTE 16V5

P21 (DC PROT)
0V
P22 ⏼ (+300V)
300V
P22 ⏻ (+300V)
300V

→ = 0V

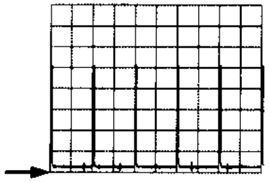
OSC_blk2.AI
130397

S6 (HD)



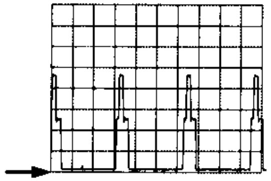
1V / div DC
10μs / div

S7 (VD)



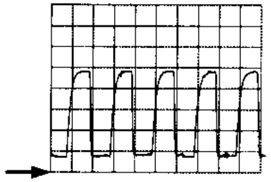
1V / div DC
5ms / div

S8 (SC_2FH)



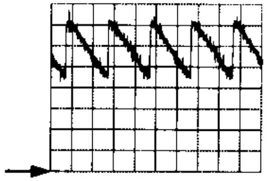
1V. / div DC
10μs / div

S9 (HDRIVE)



1V / div DC
5 μs / div

S10 (VDNEG)



0.2V / div DC
5ms / div

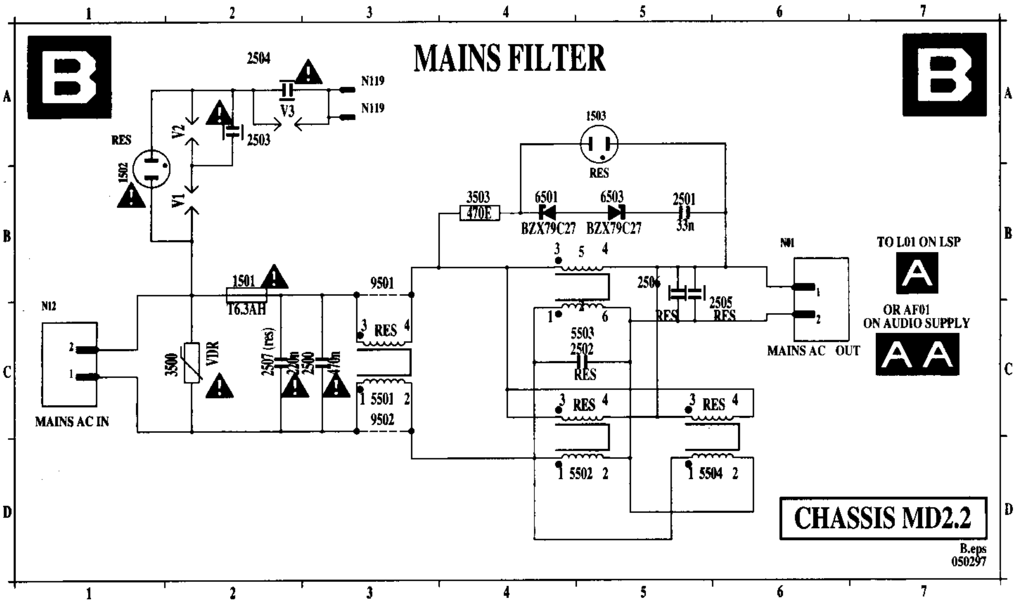
→ = 0V

OSC_B.AI
180396

See appendix for circuit diagram LSP & SSP & DDP

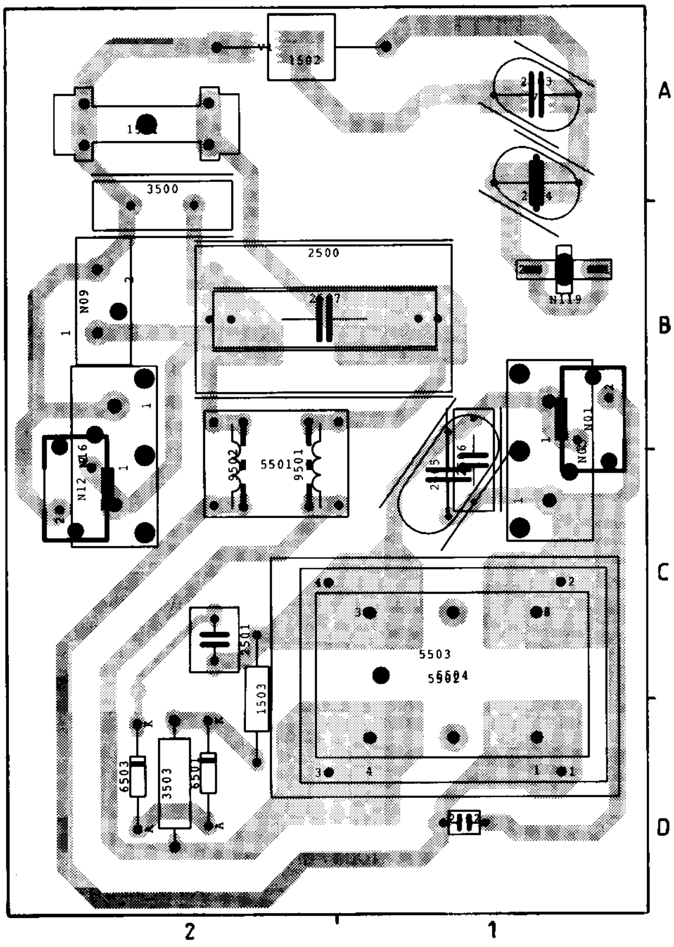
Mains filter panel / Netzfilterplatine / Platine filtre d'alimentation

1501	B 2	2500	C 3	2503	A 2	2506	B 5	3503	B 4	5503	C 5	6503	B 5	N01	B 6	N12	C 1	V3	A 2
1502	B 1	2501	B 5	2504	A 2	2507	C 2	5501	C 3	5504	D 6	9501	B 3	N119	A 3	V1	B 2		
1503	A 5	2502	C 5	2505	C 6	3500	C 2	5502	D 5	6501	B 4	9502	C 3	N119	A 3	V2	A 2		



1
2
3
4
5
6
7
A
B
C
D
B
MAINS FILTER
2504
N119
N119
V3
2503
RES
1502
V2
V1
1503
RES
3503
470E
6501
BZX79C27
6503
BZX79C27
2501
33n
N01
TO L01 ON LSP
A
OR AF01
ON AUDIO SUPPLY
A A
MAINS AC OUT
N12
MAINS AC IN
1501
T6.3AH
3500
VDR
2507 (res)
2500
220n
470n
9501
RES
5501
9502
3
5
4
1
6
5503
2502
RES
2506
RES
2505
RES
RES
RES
5502
5504
CHASSIS MD2.2
B.eps
050297

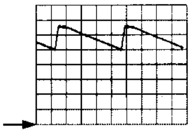
1501	A 2	2500	B 2	2503	A 1	2506	C 1	3503	D 2	5503	D 1	6503	D 2	N01	B 1	N12	C 2
1502	A 1	2501	C 2	2504	A 1	2507	B 2	5501	B 2	5504	D 1	9501	B 2	N03	C 1	N16	B 2
1503	C 2	2502	D 1	2505	C 1	3500	B 2	5502	D 1	6501	D 2	9502	B 2	N09	B 2	N119	B 1



V1
1502
3500
2500
2507
N09
N119
N16
N12
9502
5501
9501
N01
N03
3501
1503
5503
5504
6503
3503
6501
A
B
C
D
2
1

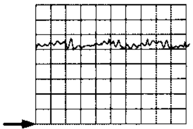
P14 ⏼ (+25V)
27V5 DC

P14 ⏻ (+25V)



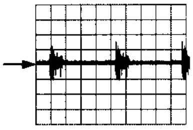
1V / div DC
0.1s / div

P15 ⏼ (+5S)



1V / div DC
10µs / div

P15 ⏻ (+5S)

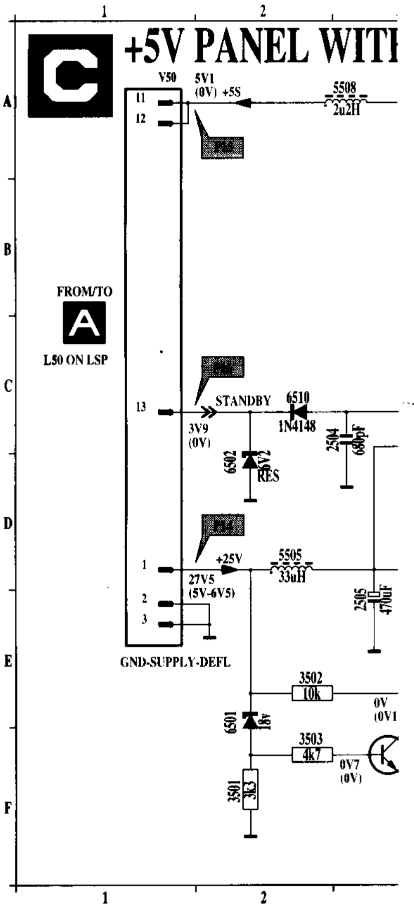


0.1V / div DC
0.1s / div

→ = 0V

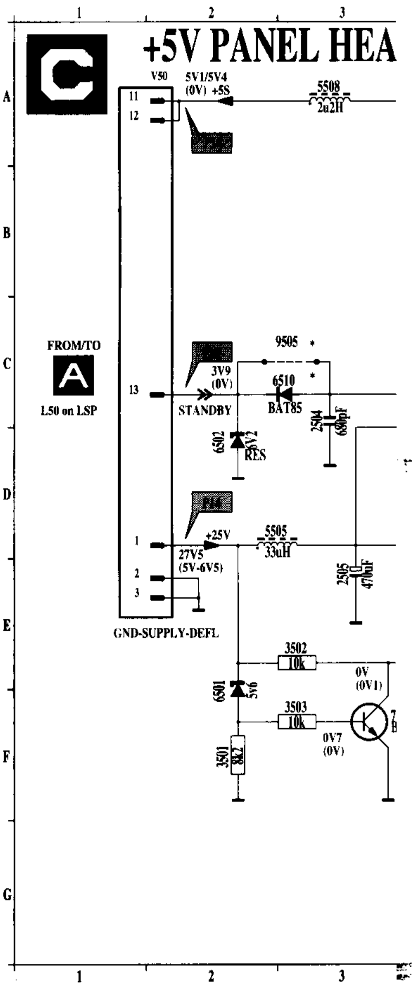
OSC_C.AI
110397

2504	C 3	2509	C 4	2530	C 9	3504	E 3	3
2505	E 3	2510	D 4	3501	F 2	3505	C 3	3
2507	B 4	2520	B 7	3502	E 2	3507	B 8	3
2508	C 4	2521	C 7	3503	F 2	3508	B 4	3



1
2
A
B
C
D
E
F
C
+5V PANEL WITI
V50
5V1
(0V) +5S
5508
2u2H
11
12
FROM/TO
A
L50 ON LSP
13
STANDBY
6510
1N4148
3V9
(0V)
2504
680pF
6502
5V2
RES
1
+25V
5505
33uH
27V5
(5V-6V5)
2
3
2505
470uF
GND-SUPPLY-DEFL
3502
10k
0V
(0V1
6501
18V
3503
4k7
0V7
(0V)
3501
3k3

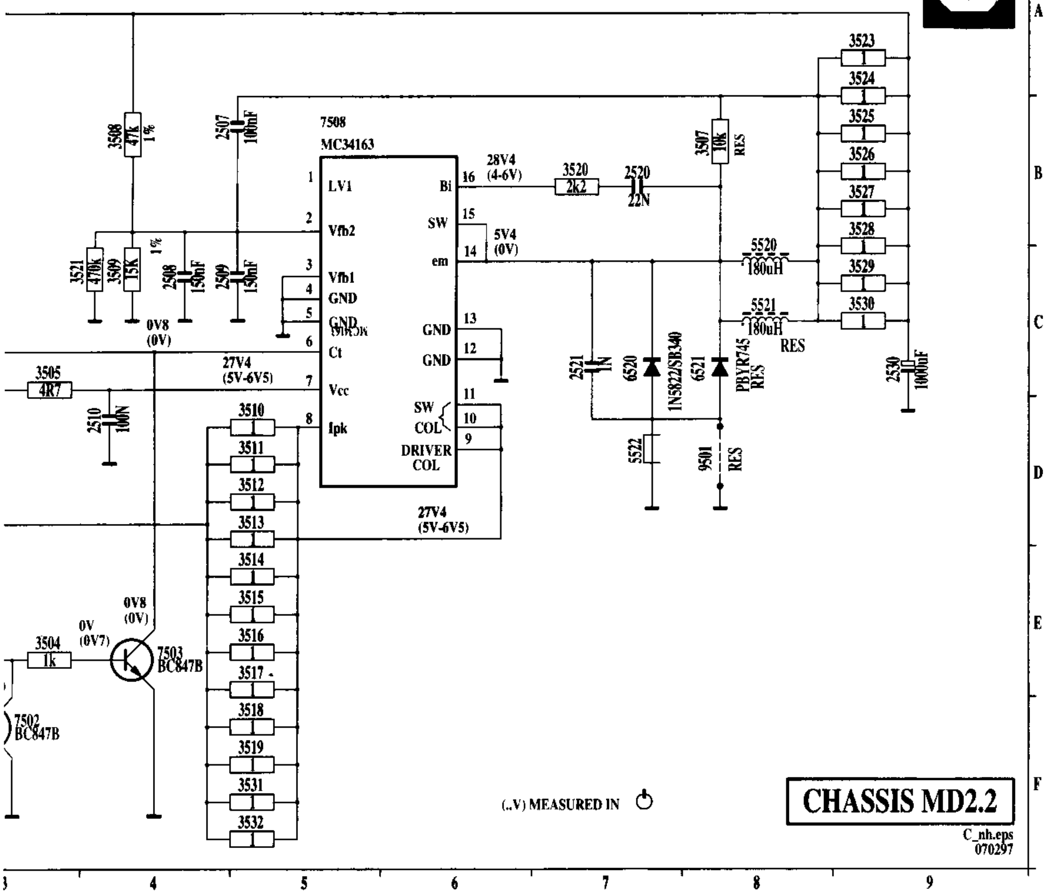
2504	C 3	2510	D 4	3502	E 3	3508	B 4	3513
2505	E 3	2520	B 8	3503	F 3	3509	C 4	3514
2507	B 5	2521	C 7	3504	E 4	3510	D 5	3515
2508	C 4	2530	D 9	3505	C 4	3511	D 5	3516
2509	C 5	3501	F 2	3507	B 8	3512	D 5	3517



1
2
3
A
B
C
D
E
F
G
C
+5V PANEL HEA
V50
5V1/5V4
(0V) +5S
5508
2u2H
11
12
FROM/TO
A
L50 on LSP
9505
3V9
(0V)
13
STANDBY
6510
BAT85
2504
680pF
6502
5V2
RES
1
+25V
5505
33uH
27V5
(5V-6V5)
2
3
2505
470uF
GND-SUPPLY-DEFL
3502
10k
0V
(0V1)
6501
5V6
3503
10k
0V7
(0V)
3501
3k2

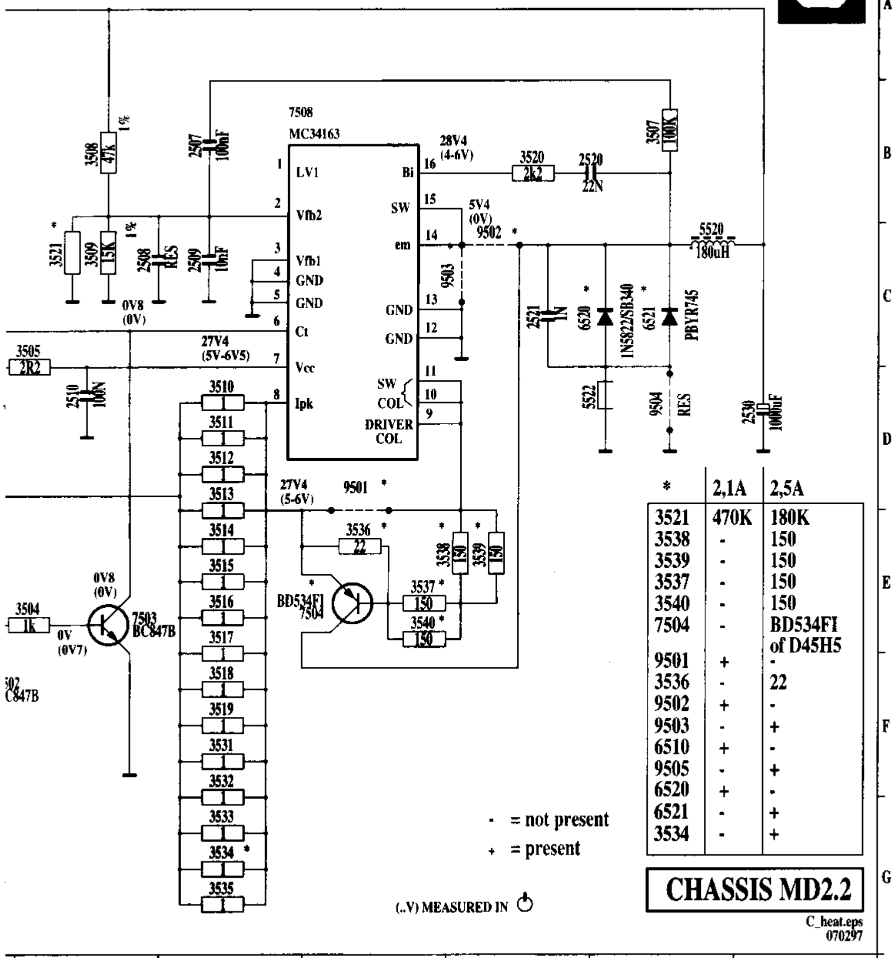
509	C 4
510	D 5
511	D 5
512	D 5
3513	D 5
3514	E 5
3515	E 5
3516	E 5
3517	E 5
3518	F 5
3519	F 5
3520	B 7
3521	C 4
3523	A 9
3524	A 9
3525	B 9
3526	B 9
3527	B 9
3528	B 9
3529	C 9
3530	C 9
3531	F 5
3532	F 5
5505	D 2
5508	A 3
5520	C 8
5521	C 8
5522	D 7
6501	E 2
6502	D 2
6510	C 2
6520	C 7
6521	C 8
7502	F 3
7503	E 4
7508	B 5
9501	D 8
V50	A 1

IOUT HEATSINK


7508
MC34163
LV1
Vfb2
Vfb1
GND
GND
Ct
Vcc
Ipk
Bi
SW
em
GND
GND
SW
COL
DRIVER
COL
28V4
(4-6V)
5V4
(0V)
0V8
(0V)
27V4
(5V-6V5)
3505
4R7
2510
100N
3508
47K
1%
2507
100nF
3521
470K
3509
15K
2508
150nF
2509
150nF
3520
2k2
2520
22N
3507
10K
RES
5520
180uH
5521
180uH
RES
2521
1N
6520
1N5822/SB340
6521
PBYR745
RES
5522
9501
RES
2530
1000uF
3510
3511
3512
3513
3514
3515
3516
3517
3518
3519
3531
3532
3523
3524
3525
3526
3527
3528
3529
3530
3504
1k
0V
(0V7)
0V8
(0V)
7503
BC847B
7502
BC847B
(..V) MEASURED IN
CHASSIS MD2.2
C_nh.eps
070297

	D 5
	E 5
	E 5
	E 5
	E 5
3518	F 5
3519	F 5
3520	B 7
3521	C 4
3531	F 5
3532	F 5
3533	G 5
3534	G 5
3535	G 5
3536	E 6
3537	E 6
3538	E 7
3539	E 7
3540	E 6
5505	D 3
5508	A 3
5520	C 8
5522	D 8
6501	E 2
6502	D 2
6510	C 3
6520	C 7
6521	C 8
7502	F 3
7503	E 4
7504	E 6
7508	B 5
9501	D 6
9502	C 7
9503	C 7
9504	D 8
9505	C 3
V50	A 2

TSINK 1 CM (2.1A) /2.5 CM (2.5A)


7508
MC34163
LV1
Vfb2
Vfb1
GND
GND
Ct
Vcc
Ipk
Bi
SW
em
GND
GND
SW
COL
DRIVER
COL
28V4
(4-6V)
5V4
(0V)
9502
9503
0V8
(0V)
27V4
(5V-6V5)
3505
2R2
2510
100N
3508
47K
1%
2507
100nF
3521
3509
15K
2508
RES
2509
10nF
3520
2k2
2520
22N
3507
100K
5520
180uH
2521
1N
6520
1N5822/SB340
6521
PBYR745
5522
9504
RES
2530
1000uF
27V4
(5-6V)
9501
3536
22
3538
150
3539
150
3537
150
3540
150
BD534FI
7504
3510
3511
3512
3513
3514
3515
3516
3517
3518
3519
3531
3532
3533
3534
3535
3504
1k
0V
(0V7)
0V8
(0V)
7503
BC847B
502
C847B
(..V) MEASURED IN
CHASSIS MD2.2
C_heat.eps
070297

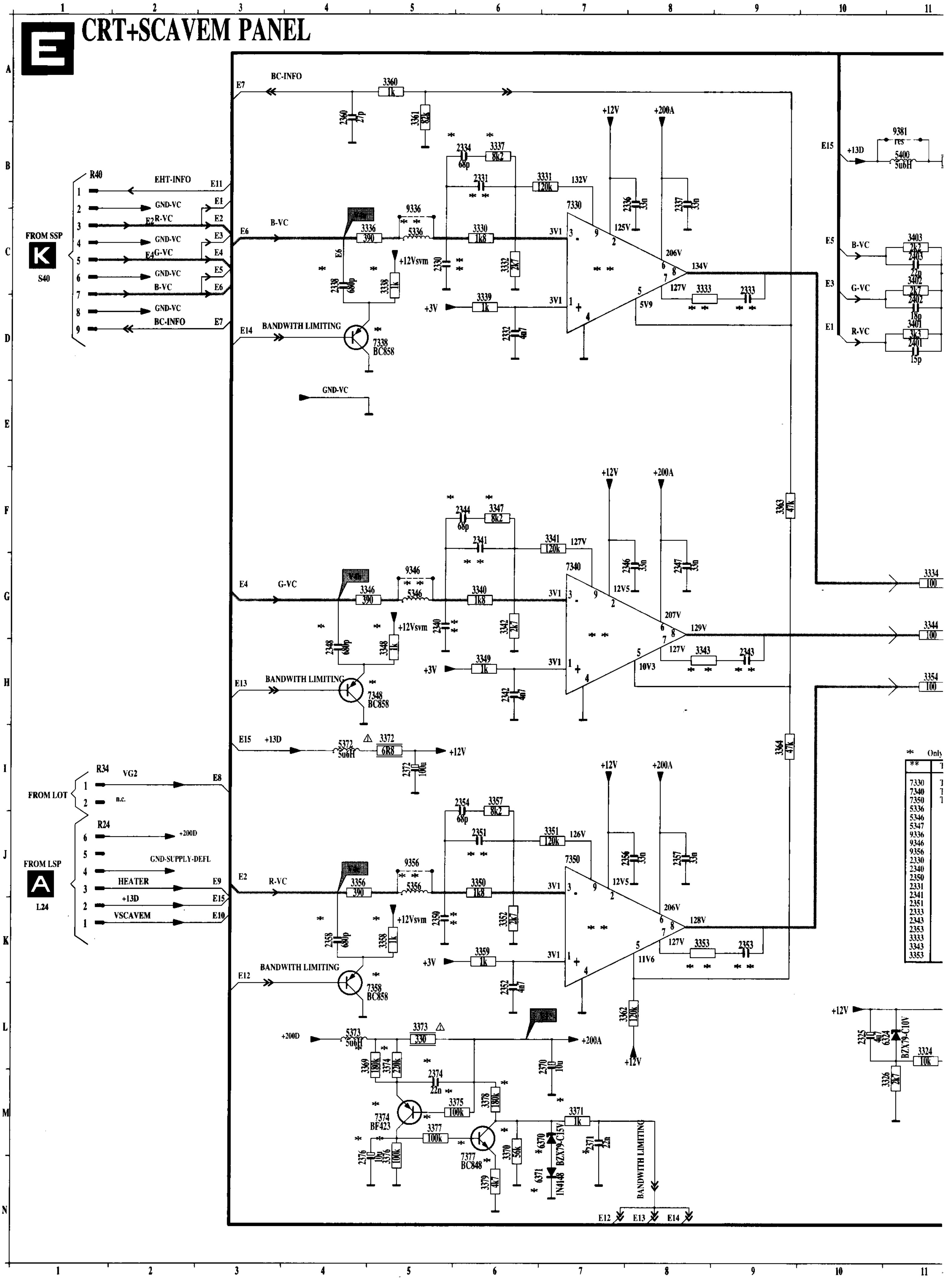
*	2,1A	2,5A
3521	470K	180K
3538	-	150
3539	-	150
3537	-	150
3540	-	150
7504	-	BD534FI of D45H5
9501	+	-
3536	-	22
9502	+	-
9503	-	+
6510	+	-
9505	-	+
6520	+	-
6521	-	+
3534	-	+

- = not present
+ = present

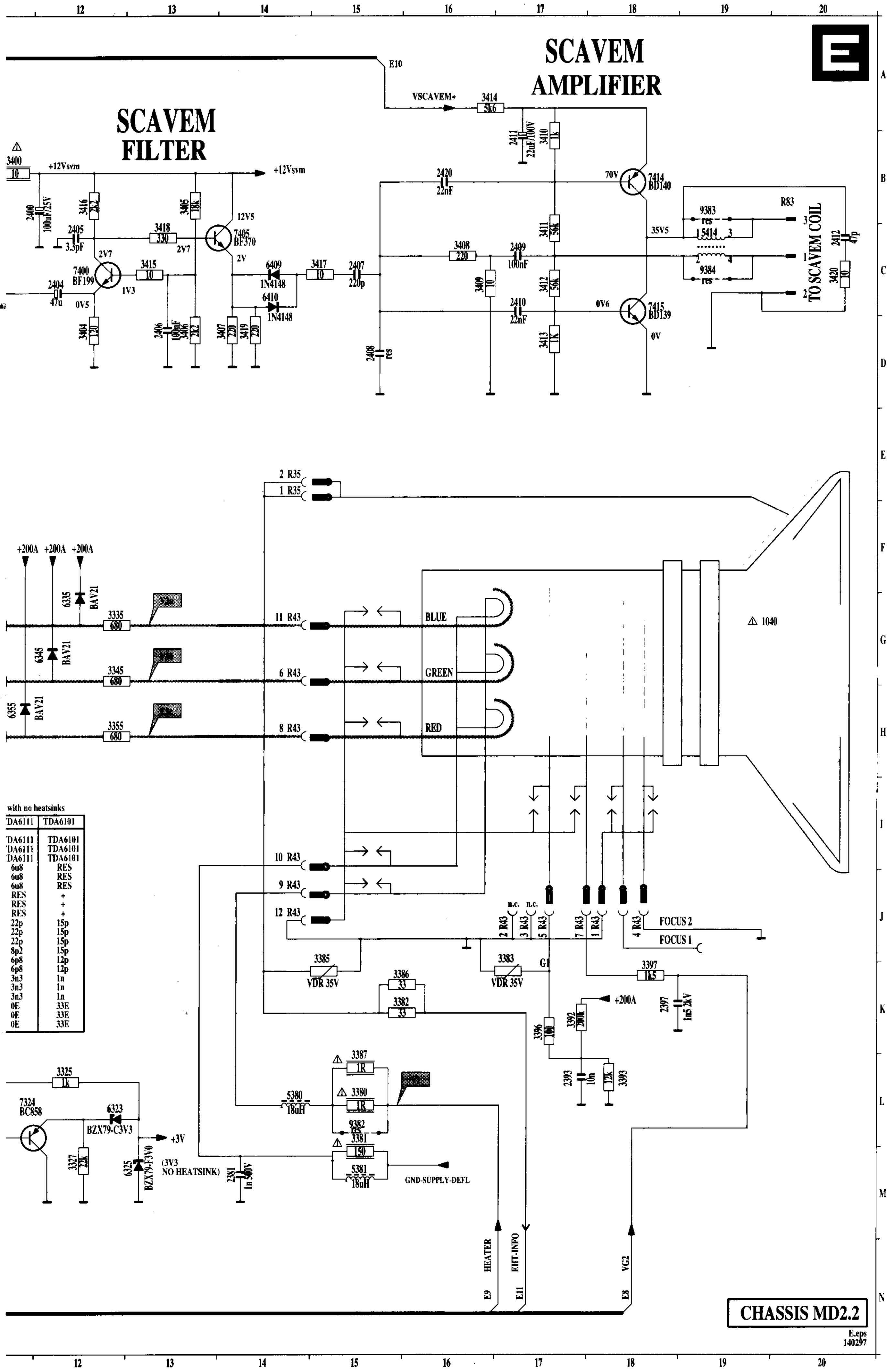
0050	A 1
2504	B 1
2505	B 2
2507	A 1
2508	A 1
2509	A 1
2510	B 1

A

B


E
CRT+SCAVEM PANEL
FROM SSP
K
S40
R40
EHT-INFO
GND-VC
R-VC
G-VC
B-VC
BC-INFO
E11
E1
E2
E3
E4
E5
E6
E7
BC-INFO
3360 1k
2360 27p
3361 82k
+12V
+200A
2334 68p
3337 8k2
2331
3331 120k
132V
2336 33n
2337 33n
7330
B-VC
9336
3336 390
5336
3330 1k8
3V1
125V
206V
134V
127V
3333
2333
2330
3332 2k7
2338 680p
3338 1k
+12Vsvm
+3V
3339 1k
5V9
2332 4n7
E14
BANDWITH LIMITING
7338 BC858
GND-VC
E15
+13D
9381 res
5400 5u6H
3403 2k2
2403 220p
3402 2k7
2402 18p
3401 3k3
2401 15p
3363 47k
2344 68p
3347 8k2
2341
3341 120k
127V
2346 33n
2347 33n
7340
G-VC
9346
3346 390
5346
3340 1k8
12V5
207V
129V
3343
2343
2340
3342 2k7
2348 680p
3348 1k
3349 1k
10V3
2342 4n7
E13
7348 BC858
3334 100
3344 100
3354 100
5372 5u6H
3372 6R8
2372 100u
3364 47k
FROM LOT
R34
VG2
E8
n.c.
FROM LSP
A
L24
R24
+200D
GND-SUPPLY-DEFL
HEATER
VSCAVEM
E9
E10
2354 68p
3357 8k2
2351
3351 120k
126V
2356 33n
2357 33n
7350
R-VC
9356
3356 390
5356
3350 1k8
128V
3353
2353
2350
3352 2k7
2358 680p
3358 1k
3359 1k
11V6
2352 4n7
E12
7358 BC858
3362 120k
5373 5u6H
3373 330
2370 10u
3369 180k
3374 220k
2374 22n
3375 100k
3378 180k
7374 BF423
3377 100k
7377 BC848
3371 1k
6370 BZX79-C15V
2371 22n
2376 10u
3376 100k
3370 56k
6371 1N4148
3379 4k7
BANDWITH LIMITING
2325 4u7
6324 BZX79-C10V
3324 10k
3326 2k7
Only
7330
7340
7350
5336
5346
5347
9336
9346
9356
2330
2340
2350
2331
2341
2351
2333
2343
2353
3333
3343
3353

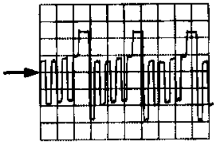
Bildröhren & SCAVEM-Platine / Platine tube-image & SCAVEM


E
SCAVEM AMPLIFIER
SCAVEM FILTER
E10
VSCAVEM+
3414 5k6
2411 22uF/100V
3410 1k
3400 10
+12Vsvm
2400 100uF/25V
3416 2K2
3405 18k
12V5
7405 BF370
2405 3.3pF
3418 330
2V7
2V
7400 BF199
3415 10
1V3
2404 47u
0V5
3404 120
2406 100nF
3406 2K2
3407 220
3419 220
6409 1N4148
6410 1N4148
3417 10
2407 220p
2408 res
2420 22nF
3408 220
2409 100nF
3409 10
3411 56k
3412 56k
3413 1K
2410 22nF
70V
7414 BD140
35V5
0V6
7415 BD139
0V
9383 res
5414
9384 res
R83
TO SCAVEM COIL
2412 47p
3420 10
2 R35
1 R35
+200A
6335 BAV21
6345 BAV21
6355 BAV21
3335 680
3345 680
3355 680
11 R43
6 R43
8 R43
BLUE
GREEN
RED
1040
10 R43
9 R43
12 R43
n.c.
2 R43
3 R43
5 R43
7 R43
1 R43
4 R43
FOCUS 2
FOCUS 1
G1
3385 VDR 35V
3383 VDR 35V
3386 33
3382 33
3397 1k5
3392 200K
2397 1n5 2kV
3396 100
2393 10n
3393 12k
with no heatsinks
DA6111 TDA6101
DA6111 TDA6101
DA6111 TDA6101
DA6111 TDA6101
6u8 RES
6u8 RES
6u8 RES
RES +
RES +
RES +
22p 15p
22p 15p
22p 15p
8p2 15p
6p8 12p
6p8 12p
3n3 1n
3n3 1n
3n3 1n
0E 33E
0E 33E
0E 33E
3325 1k
7324 BC858
6323 BZX79-C3V3
+3V
3327 22k
6325 BZX79-F3V0
(3V3 NO HEATSINK)
2381 1n 500V
3387 1R
3380 1R
5380 18uH
9382 res
3381 150
5381 18uH
GND-SUPPLY-DEFL
HEATER
EHT-INFO
VG2
E9
E11
E8
CHASSIS MD2.2
E.eps 140297
12 13 14 15 16 17 18 19 20
A B C D E F G H I J K L M N

2325	L10
2330	C 5
2331	B 6
2332	D 6
2333	C 9
2334	B 6
2336	B 8
2337	B 8
2338	C 4
2340	G 5
2341	F 6
2342	H 6
2343	H 9
2344	F 6
2346	G 8
2347	G 8
2348	H 4
2350	K 5
2351	J 6
2352	L 6
2353	K 9
2354	I 6
2356	J 8
2357	J 8
2358	K 4
2360	A 4
2370	L 7
2371	M 7
2372	I 5
2374	M 5
2376	M 4
2381	M14
2393	L17
2397	K18
2400	B11
2401	D11
2402	D11
2403	C11
2404	C12
2405	C12
2406	D13
2407	C15
2408	D15
2409	C17
2410	C17
2411	B17
2412	C20
2420	B16
3324	L11
3325	L12
3326	M11
3327	M12
3330	C 6
3331	B 7
3332	C 6
3333	C 8
3334	G11
3335	G12
3336	C 5
3337	B 6
3338	C 5
3339	D 6
3340	G 6
3341	F 7
3342	G 6
3343	H 8
3344	G11
3345	G12
3346	G 5
3347	F 6
3348	H 5
3349	H 6
3350	J 6
3351	J 7
3352	K 6
3353	K 8
3354	H11
3355	H12
3356	J 4
3357	I 6
3358	K 5
3359	K 6
3360	A 5
3361	A 5
3362	L 8
3363	F 9
3364	I 9
3369	L 5
3370	M 6
3371	M 7
3372	I 5
3373	L 5
3374	L 5
3375	M 6
3376	M 5
3377	M 5
3378	M 6
3379	N 6
3380	L15
3381	L15
3382	K16
3383	J17
3385	J15
3386	K16
3387	L15
3392	K17
3393	L18
3396	K17
3397	K18
3400	B11
3401	D11
3402	C11
3403	C11
3404	D12
3405	B13
3406	D13
3407	D14
3408	C16
3409	C16
3410	B17
3411	C17
3412	C17
3413	D17
3414	A16
3415	C13
3416	B12
3417	C15
3418	C13
3419	D14
3420	C20
5336	C 5
5346	G 5
5356	J 5
5372	I 4
5373	L 4
5380	L14
5381	M15
5400	B11
5414	C19
6323	L12
6324	L11
6325	M13
6335	G12
6345	G12
6355	H11
6370	M 7
6371	N 7
6409	C14
6410	C14
7324	L11
7330	B 7
7338	D 5
7340	G 7
7348	H 4
7350	J 7
7358	L 4
7374	M 5
7377	N 6
7400	C12
7405	C14
7414	B18
7415	C18
9336	C 5
9346	G 5
9356	J 5
9381	B11
9382	L15
9383	B19
9384	C19
R24	J 2
R34	I 1
R35	E14
R35	E14
R40	B 1
R43	J18
R43	J17
R43	J17
R43	J18
R43	J17
R43	G14
R43	J17
R43	H14
R43	J14
R43	I14
R43	G14
R43	J14
R83	B20

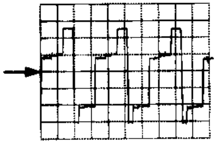
V1 (+200D)
200V DC

V3a (RGB cathodes)



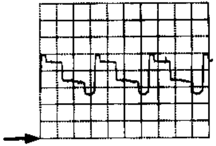
20V / div AC
10µs / div

V3c (RGB cathodes)



20V / div AC
10µs / div

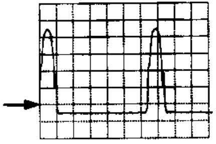
V4b (RGB IC7500)



1V / div DC
10µs / div

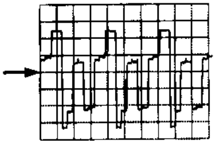
→ = 0V

V2 (HEATER)



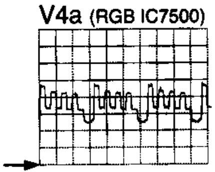
5V / div DC
5µs / div

V3b (RGB cathodes)



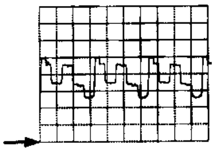
20V / div AC
10µs / div

V4a (RGB IC7500)



1V / div DC
10µs / div

V4c (RGB IC7500)

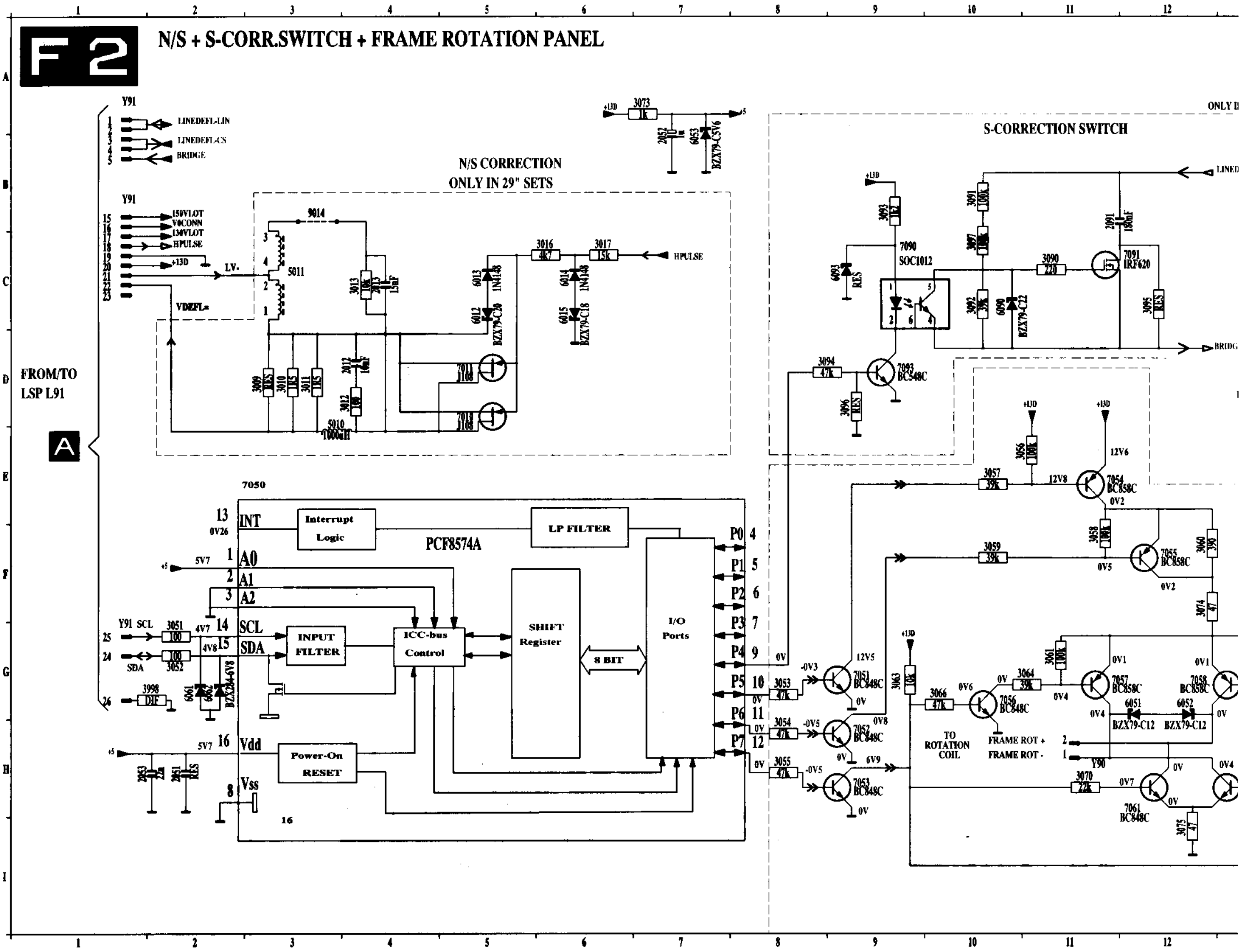


1V / div DC
10µs / div

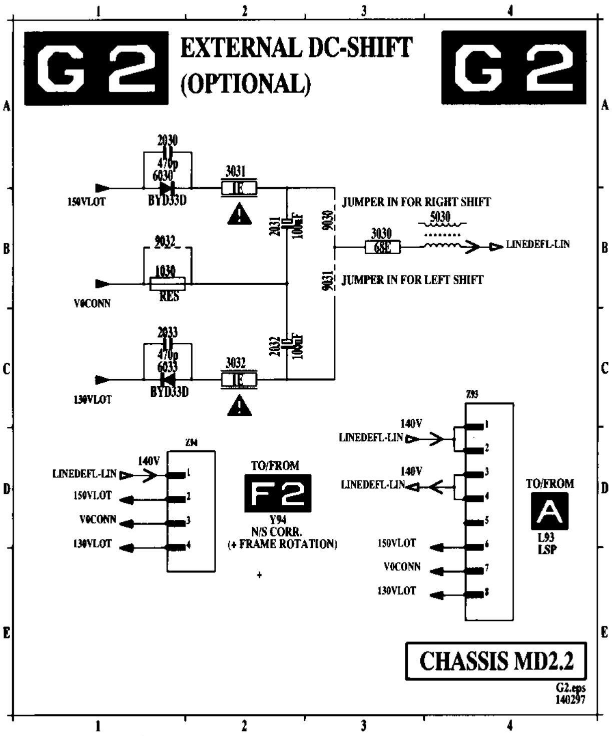
OSC_E.AI
180396

North/South + Frame rotation + S-correction panel /
Nord/Süd + Drehrahmen + S-Korrekturplatine /
Platine N/S + rotation de Trame + Correction S

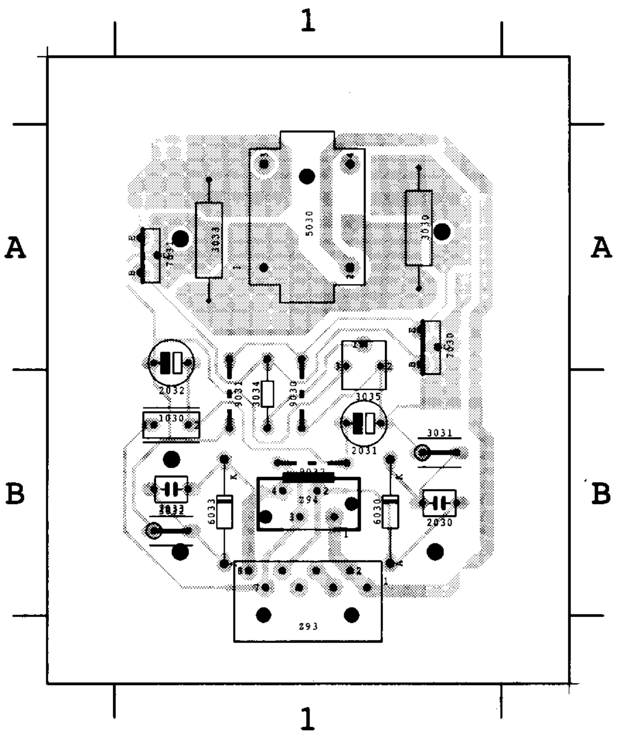
2012	D 4
2013	C 4
2051	H 2
2052	A 7
2053	H 1
2091	B11
3009	D 3
3010	D 3
3011	D 3
3012	D 4
3013	C 4
3016	C 6
3017	C 6
3051	G 2
3052	G 2
3053	G 8
3054	H 8
3055	H 8
3056	E11
3057	E10
3058	F11
3059	F10
3060	F12
3061	G11
3062	G13
3063	G 9
3064	G11
3065	G13
3066	G10
3067	G14
3068	G14
3069	H13
3070	H11
3072	H14
3073	A 7
3074	F12
3075	I12
3090	C11
3091	B10
3092	C10
3093	B 9
3094	D 9
3095	C12
3096	D 9
3097	C10
3998	G 2
5010	E 3
5011	C 3
6012	C 5
6013	C 5
6014	C 6
6015	C 6
6051	G12
6052	G12
6053	B 7
6061	G 2
6062	G 2
6090	C10
6093	C 9
7010	D 5
7011	D 5
7050	E 2
7051	G 9
7052	H 9
7053	H 9
7054	E11
7055	F12
7056	G10
7057	G11
7058	G12
7059	G14
7060	H13
7061	H12
7062	H14
7090	C 9
7091	C12


1
2
3
4
5
6
7
8
9
10
11
12
A
B
C
D
E
F
G
H
I
F 2
N/S + S-CORR.SWITCH + FRAME ROTATION PANEL
Y91
LINEDEFL-LIN
LINEDEFL-CS
BRIDGE
150VLOT
VOCONN
130VLOT
HPULSE
+13D
LV-
VDEFL=
FROM/TO
LSP L91
A
N/S CORRECTION
ONLY IN 29" SETS
9014
5011
3013
10k
2013
15nF
6013
1N4148
6012
BZX79-C20
3016
4k7
3017
15k
6014
1N4148
6015
BZX79-C18
HPULSE
3009
RES
3010
1R5
3011
1R5
2012
10nF
3012
10E
5010
1000uH
7011
J108
7010
J108
+13D
3073
1k
2052
1u
6053
BZX79-C5V6
+5
S-CORRECTION SWITCH
ONLY I
LINED
+13D
3093
1K2
7090
SOC1012
6093
RES
3091
100K
3097
180K
3092
39K
6090
BZX79-C22
3090
220
2091
180nF
7091
IRF620
3095
RES
BRIDG
3094
47k
7093
BC548C
3096
RES
7050
13
0V26
INT
Interrupt
Logic
LP FILTER
PCF8574A
+5
5V7
1
A0
2
A1
3
A2
Y91
SCL
3051
100
4V7
14
SCL
25
24
SDA
3052
100
4V8
15
SDA
INPUT
FILTER
ICC-bus
Control
SHIFT
Register
8 BIT
I/O
Ports
6061
6062
BZX284-6V8
26
3998
DIF
+5
5V7
16
Vdd
2053
22u
2051
RES
Power-On
RESET
8
Vss
16
P0
4
P1
5
P2
6
P3
7
P4
9
P5
10
P6
11
P7
12
0V
0V
0V
0V
+13D
3056
100K
12V6
3057
39K
12V8
7054
BC858C
0V2
3058
100K
3059
39K
0V5
7055
BC858C
3060
39E
0V2
3074
47
-0V3
3053
47k
12V5
7051
BC848C
0V
3054
47k
-0V5
7052
BC848C
0V8
0V
3055
47k
-0V5
7053
BC848C
6V9
0V
+13D
3063
10K
3061
100K
3066
47k
0V6
0V
3064
39K
7056
BC848C
0V4
7057
BC858C
0V1
0V4
6051
BZX79-C12
6052
BZX79-C12
0V
7058
BC858C
0V1
TO
ROTATION
COIL
FRAME ROT +
FRAME ROT -
2
1
Y90
3070
22k
0V7
7061
BC848C
0V
0V
0V4
3075
47

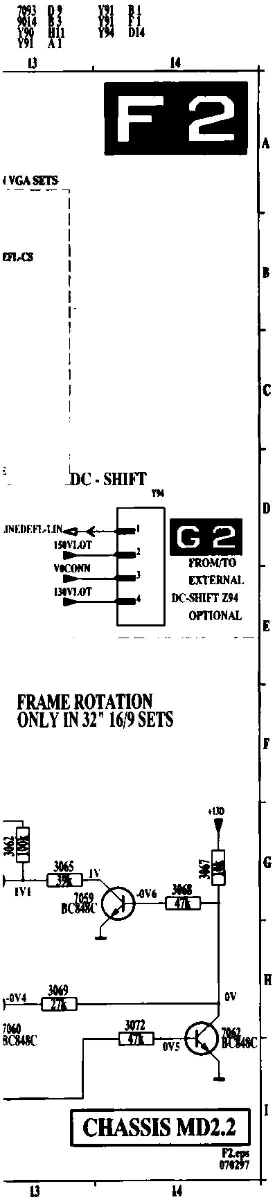
1030	B 1
2030	A 1
2031	B 2
2032	C 2
2033	C 1
3030	B 3
3031	A 2
3032	C 2
5030	B 4
6030	A 1
6033	C 1
9030	B 3
9031	B 3
9032	B 1
Z93	C 4
Z94	D 2


1
2
3
4
A
B
C
D
E
G 2
EXTERNAL DC-SHIFT
(OPTIONAL)
G 2
2030
470p
6030
BYD33D
150VLOT
3031
1E
2031
100uF
9030
JUMPER IN FOR RIGHT SHIFT
5030
3030
68E
LINEDEFL-LIN
9032
1030
RES
VOCONN
9031
JUMPER IN FOR LEFT SHIFT
2033
470p
6033
BYD33D
130VLOT
3032
1E
2032
100uF
Z94
LINEDEFL-LIN
140V
150VLOT
VOCONN
130VLOT
TO/FROM
F2
Y94
N/S CORR.
(+ FRAME ROTATION)
Z93
140V
LINEDEFL-LIN
140V
LINEDEFL-LIN
150VLOT
VOCONN
130VLOT
TO/FROM
A
L93
LSP
CHASSIS MD2.2
G2.eps
140297

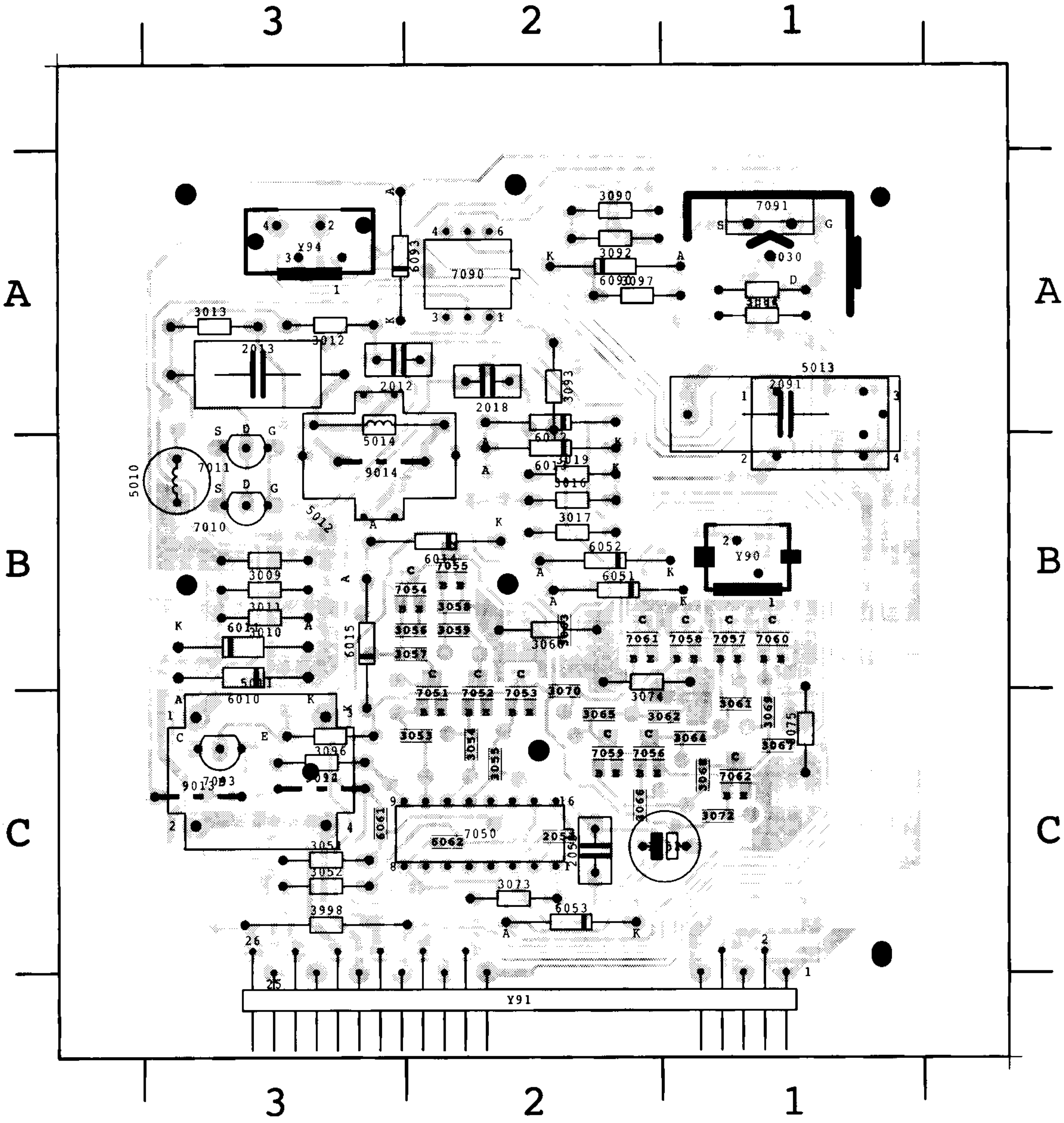
1030	B 1
2030	B 1
2031	B 1
2032	A 1
2033	B 1
3030	A 1
3031	B 1
3032	B 1
3033	A 1
3034	B 1
3035	A 1
5030	A 1
6030	B 1
6033	B 1
7030	A 1
7031	A 1
9030	A 1
9031	B 1
9032	B 1
Z93	B 1
Z94	B 1


1
A
A
B
B
1
3033
5030
3030
2032
9032
3034
9030
3035
7030
1030
2031
3031
Z94
2033
6033
6030
2030
Z93

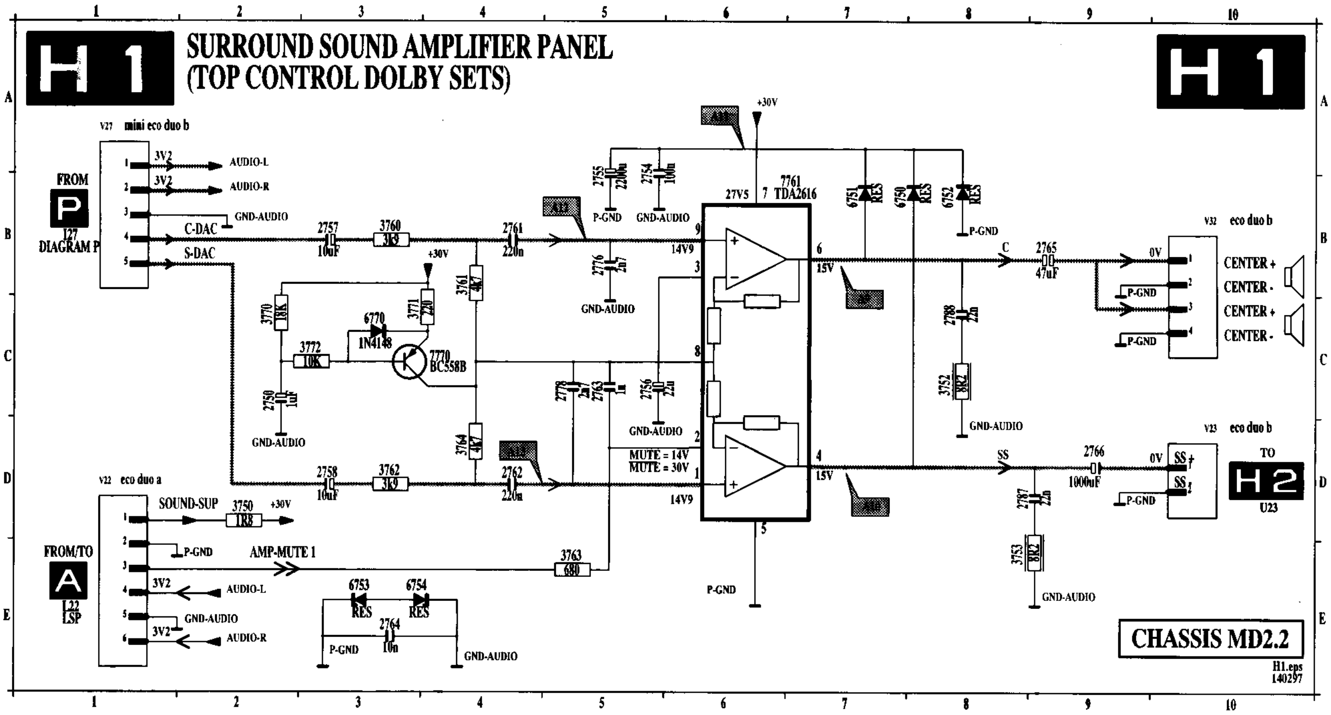
External DC shift panel / Externe-DC-verschiebungs-Platine / Platine déphasage externe CC


7093 D 9
9014 B 3
Y90 H11
Y91 A1
Y91 B 1
Y91 F 1
Y94 D14
13
14
F 2
A
B
C
D
E
F
G
H
I
VGA SETS
EFL-CS
DC - SHIFT
Y94
LINEDEFL-LIN
150VLOT
V0CONN
134VLOT
G 2
FROM/TO
EXTERNAL
DC-SHIFT Z94
OPTIONAL
FRAME ROTATION
ONLY IN 32" 16/9 SETS
3062
100K
3065
39k
1V
1V1
7059
BC848C
-0V6
3068
47k
+13D
3067
100
-0V4
3069
27k
0V
7060
BC848C
3072
47k
0V5
7062
BC848C
CHASSIS MD2.2
F2.eps
070297

0030 A 1	3010 B 3	3053 C 2	3062 C 1	3072 C 1	3095 A 1	6010 B 3	6061 C 3	7053 C 2	7062 C 1	Y94 A 3
2012 A 2	3011 B 3	3054 C 2	3063 B 2	3073 C 2	3096 C 3	6011 B 3	6062 C 2	7054 B 2	7090 A 2	
2013 A 3	3012 A 3	3055 C 2	3064 C 1	3074 B 1	3097 A 2	6012 A 2	6090 A 1	7055 B 2	7091 A 1	
2018 A 2	3013 A 3	3056 B 2	3065 C 2	3075 C 1	3998 C 3	6013 B 2	6093 A 3	7056 C 2	7093 C 3	
2051 C 2	3016 B 2	3057 B 2	3066 C 2	3090 A 2	5010 B 3	6014 B 3	7010 B 3	7057 B 1	9012 C 3	
2052 C 1	3017 B 2	3058 B 2	3067 C 1	3091 A 1	5011 C 3	6015 B 3	7011 B 3	7058 B 1	9013 C 3	
2053 C 2	3019 B 2	3059 B 2	3068 C 1	3092 A 2	5012 A 3	6051 B 2	7050 C 2	7059 C 2	9014 B 2	
2091 A 1	3051 C 3	3060 B 2	3069 C 1	3093 A 2	5013 A 1	6052 B 2	7051 C 2	7060 B 1	Y90 B 1	
3009 B 3	3052 C 3	3061 C 1	3070 C 2	3094 C 3	5014 A 2	6053 C 2	7052 C 2	7061 B 2	Y91 C 1	

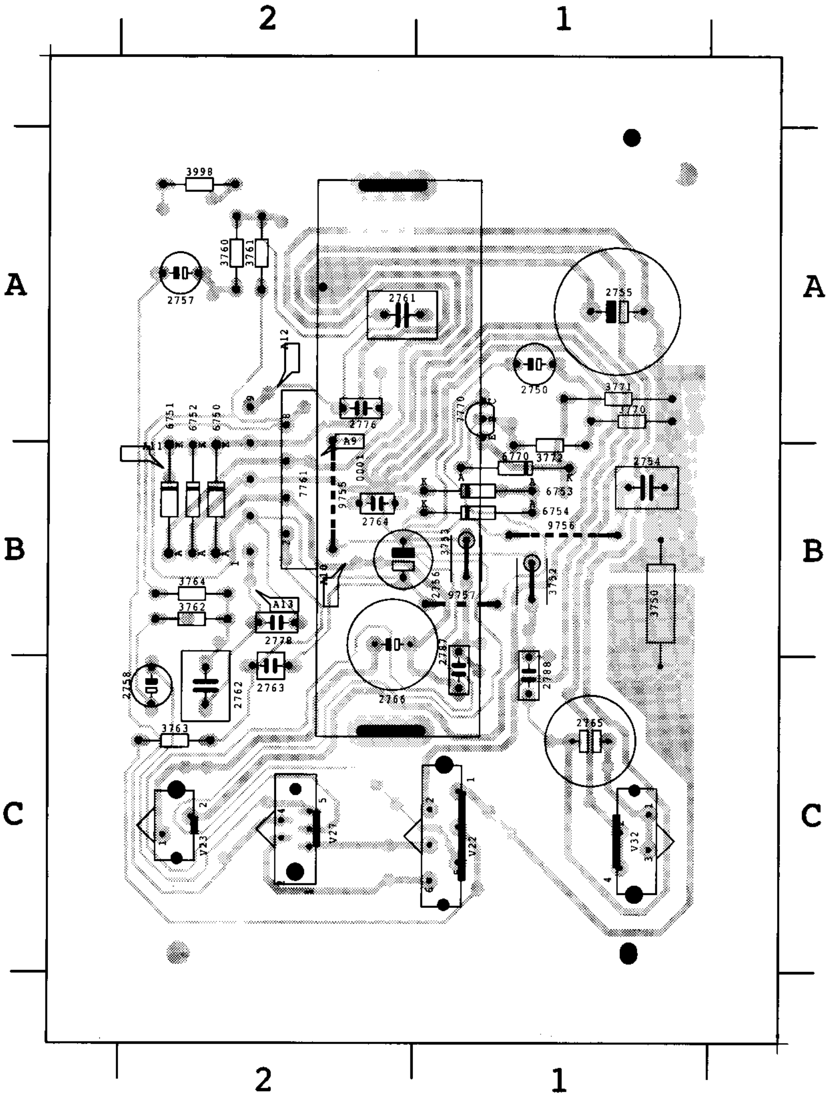

3
2
1
A
B
C
Y94
6093
7090
3090
3092
6090
3097
7091
0030
3013
3012
2013
2012
2018
3093
5013
2091
5014
9014
6012
6013
3019
3016
3017
5010
7011
7010
5012
6014
6052
6051
Y90
7055
7054
3058
3056
3059
3057
3009
3011
3010
6011
6015
5011
6010
3063
7061
7058
7057
7060
7051
7052
7053
3070
3074
3061
3069
3075
3065
3062
3064
3067
3053
3054
3055
7059
7056
3068
7062
3072
3096
7093
9013
9012
6061
7050
6062
2051
2052
2053
6066
3051
3052
3073
6053
3998
Y91
26
25
2
1

Surround sound panel / Surround Sound-Platine / Platine son Surround

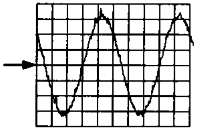

H 1
SURROUND SOUND AMPLIFIER PANEL
(TOP CONTROL DOLBY SETS)
H 1
FROM
P
I27
DIAGRAM P
V27 mini eco duo b
3V2
AUDIO-L
AUDIO-R
GND-AUDIO
C-DAC
S-DAC
2757 10uF
3760 3k9
2761 220n
+30V
2755 2200u
2754 100n
P-GND
GND-AUDIO
2776 2n7
3761 4K7
3770 1K8
3771 220
6770 1N4148
3772 10K
7770 BC558B
2750 1uF
2778
2763 1n
2756 22n
3764 4K7
27V5
7761 TDA2616
MUTE = 14V
MUTE = 30V
14V9
15V
6751 RES
6750 RES
6752 RES
C
2765 47uF
2788 22n
3752 8R2
V32 eco duo b
0V
CENTER +
CENTER -
CENTER +
CENTER -
SS
2766 1000uF
2787 22n
3753 8R2
V23 eco duo b
TO
H 2
U23
2758 10uF
3762 3k9
2762 220n
V22 eco duo a
SOUND-SUP
3750 1R8
FROM/TO
A
I22
LSP
AMP-MUTE 1
3763 680
6753 RES
6754 RES
2764 10n
P-GND
GND-AUDIO
CHASSIS MD2.2
H1.eps
140297
A9
A10
A11
A12
A13

2750	C 2
2754	A 5
2755	A 5
2756	C 5
2757	B 3
2758	D 3
2761	B 4
2762	D 4
2763	C 5
2764	E 3
2765	B 9
2766	D 9
2776	B 5
2778	C 5
2787	D 8
2788	C 8
3750	D 2
3752	C 8
3753	E 8
3760	B 3
3761	B 4
3762	D 3
3763	E 5
3764	D 4
3770	C 2
3771	C 3
3772	C 3
6750	B 7
6751	B 7
6752	B 8
6753	E 3
6754	E 3
6770	C 3
7761	B 6
7770	C 4
V22	D 1
V23	D10
V27	A 1
V32	B10

0001 A 2	2757 A 2	2764 B 2	2787 B 1	3760 A 2	3770 A 1	6751 B 2	7761 B 2	V22 C 1
2750 A 1	2758 C 2	2765 C 1	2788 C 1	3761 A 2	3771 A 1	6752 B 2	7770 A 1	V23 C 2
2754 B 1	2761 A 2	2766 B 2	3750 C 1	3762 B 2	3772 B 1	6753 B 1	9755 B 2	V27 C 2
2755 A 1	2762 C 2	2776 A 2	3752 B 1	3763 C 2	3998 A 2	6754 B 1	9756 B 1	V32 C 1
2756 B 2	2763 C 2	2778 B 2	3753 B 1	3764 B 2	6750 B 2	6770 B 1	9757 B 1	

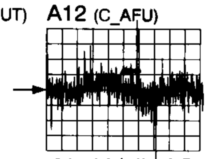

2
1
A
B
C
3998
3760
3761
2757
2761
2755
A12
2750
3771
3770
6751
6752
6750
A11
2776
A9
0001
7761
9755
2764
6770
3772
2754
6753
6754
9756
3751
3752
2766
9757
3750
3764
3762
A13
2778
2763
2758
2762
2787
2788
3763
2765
V23
V27
V22
V32

A9 (CENTER OUTPUT)



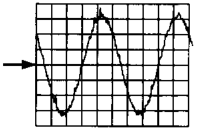
50mV / div AC
0.2ms / div

A12 (C_AFU)



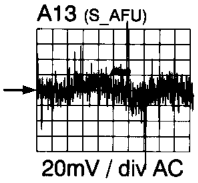
20mV / div AC
0.2ms / div

A10 (SURROUND OUTPUT)



50mV / div AC
0.2ms / div

A13 (S_AFU)



20mV / div AC
0.2ms / div

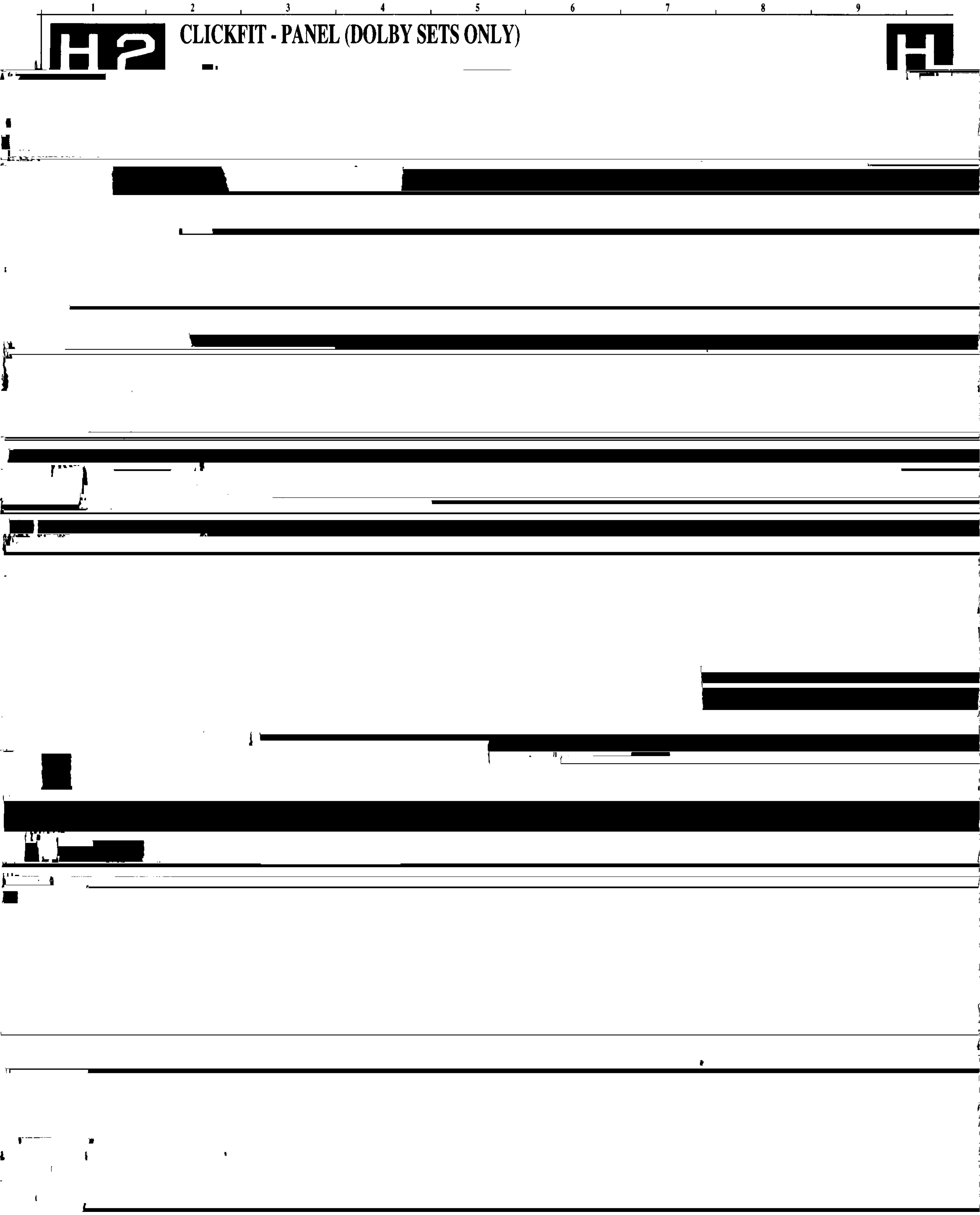
A11 (SOUND 28V)
27V5 DC

→ = 0V

OSC_H1.AI
130396

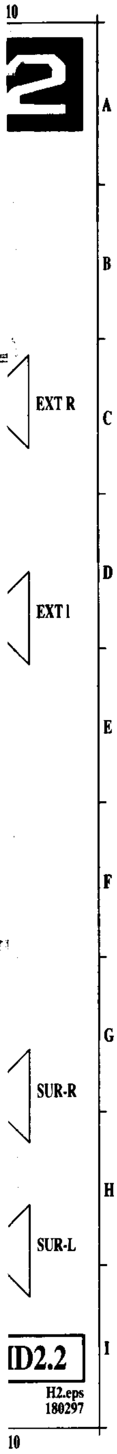
Clickfit panel / Clickfit-Platine / Platine borne de raccordement

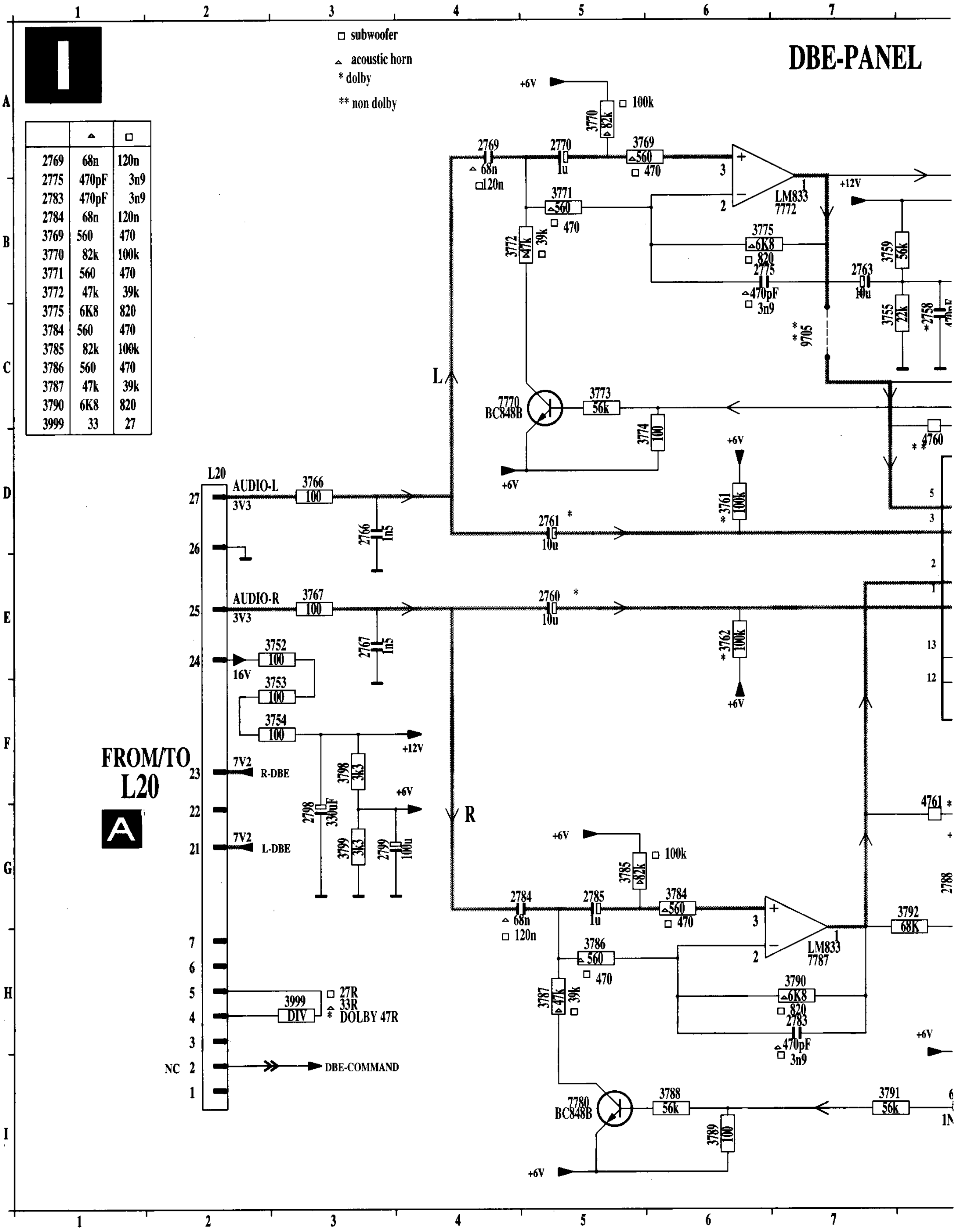
2702	D 7
2703	E 6
2704	F 6
2705	C 8
2706	D 8
2707	G 8
2708	H 8
2709*	H 7
3701	C 5
3702	D 4
3703	H 4
3704*	H 5
3998	B 5
5701	C 9
5702	D 9
5703	G 9
5704	H 9
6701	C 8
6702	E 8
6703	H 7
9701	E 4
9702	E 4
9703	E 5
9704	E 5
9705	E 6
9706	F 6
9712	H 8
CF2	B10
SK1	B 3
U138	G 3
U23	H 3
U26	A 2
U36	E 7
U37	F 7
U38	C 2
V1	C 9
V2	D 9
V3	G 9
V4	H 9
V5	D 9



CLICKFIT - PANEL (DOLBY SETS ONLY)

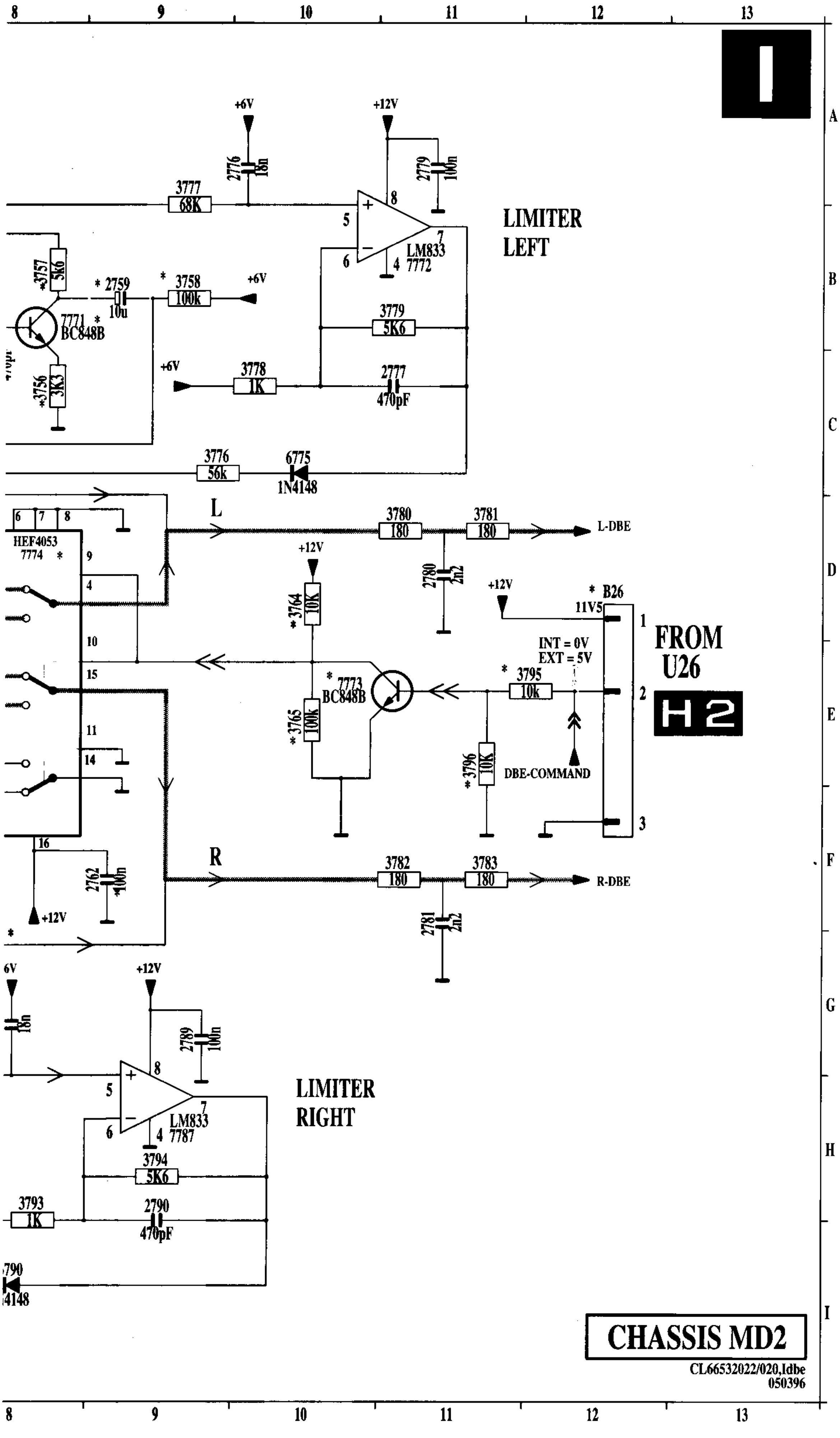
DBE (Dynamic Bass Enhancement) panel / DBE Dynamic Bass Enhancement)-Platine


10
2
A
B
C
D
E
F
G
H
I
EXT R
EXT 1
SUR-R
SUR-L
D2.2
H2.eps
180297
10


I
DBE-PANEL
□ subwoofer
△ acoustic horn
* dolby
** non dolby
FROM/TO
L20
A
L20
AUDIO-L
3V3
AUDIO-R
3V3
16V
7V2
R-DBE
7V2
L-DBE
NC
DBE-COMMAND
3766 100
3767 100
2766 1n5
2767 1n5
3752 100
3753 100
3754 100
+12V
+6V
3798 3K3
3799 3K3
2798 330uF
2799 100u
3999 DIV
□ 27R
△ 33R
* DOLBY 47R
L
R
2769 △ 68n □ 120n
2770 1u
3770 82k □ 100k
3769 △ 560 □ 470
3771 △ 560 □ 470
3772 47K 39k
LM833 7772
3775 △ 6K8 □ 820
2775 △ 470pF □ 3n9
7770 BC848B
3773 56k
3774 100
2761 10u *
2760 10u *
* 3761 100k
* 3762 100k
** 9705
2763 10u
3759 56k
3755 22k
*2758
4760
4761
2784 △ 68n □ 120n
2785 1u
3785 82k □ 100k
3784 △ 560 □ 470
3786 △ 560 □ 470
3787 47k 39k
LM833 7787
3790 △ 6K8 □ 820
2783 △ 470pF □ 3n9
3792 68K
2788
7780 BC848B
3788 56k
3789 100
3791 56k
+6V
+12V

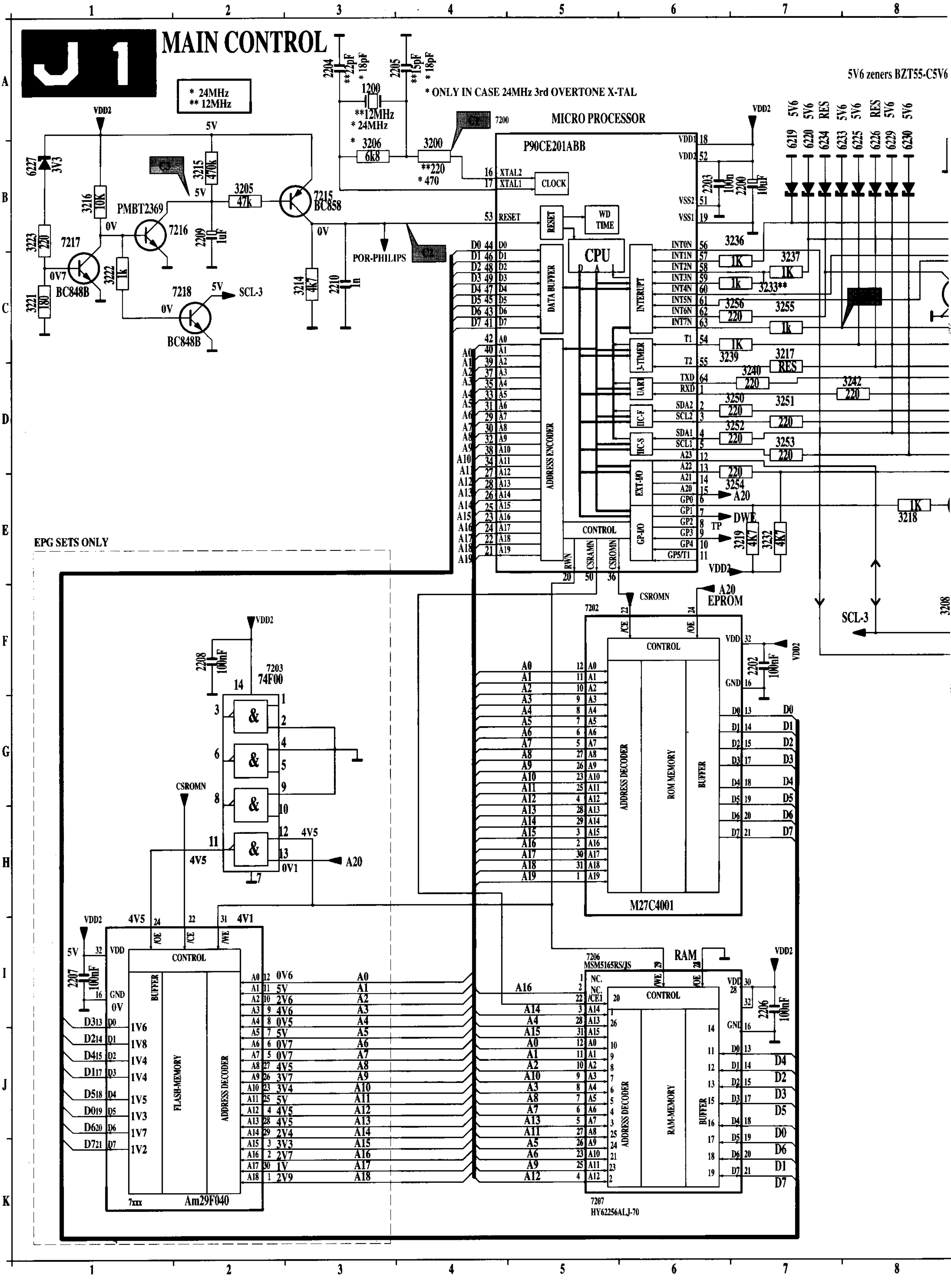
	△	□
2769	68n	120n
2775	470pF	3n9
2783	470pF	3n9
2784	68n	120n
3769	560	470
3770	82k	100k
3771	560	470
3772	47k	39k
3775	6K8	820
3784	560	470
3785	82k	100k
3786	560	470
3787	47k	39k
3790	6K8	820
3999	33	27

Platine DBE (Amélioration Dynamique des Basses

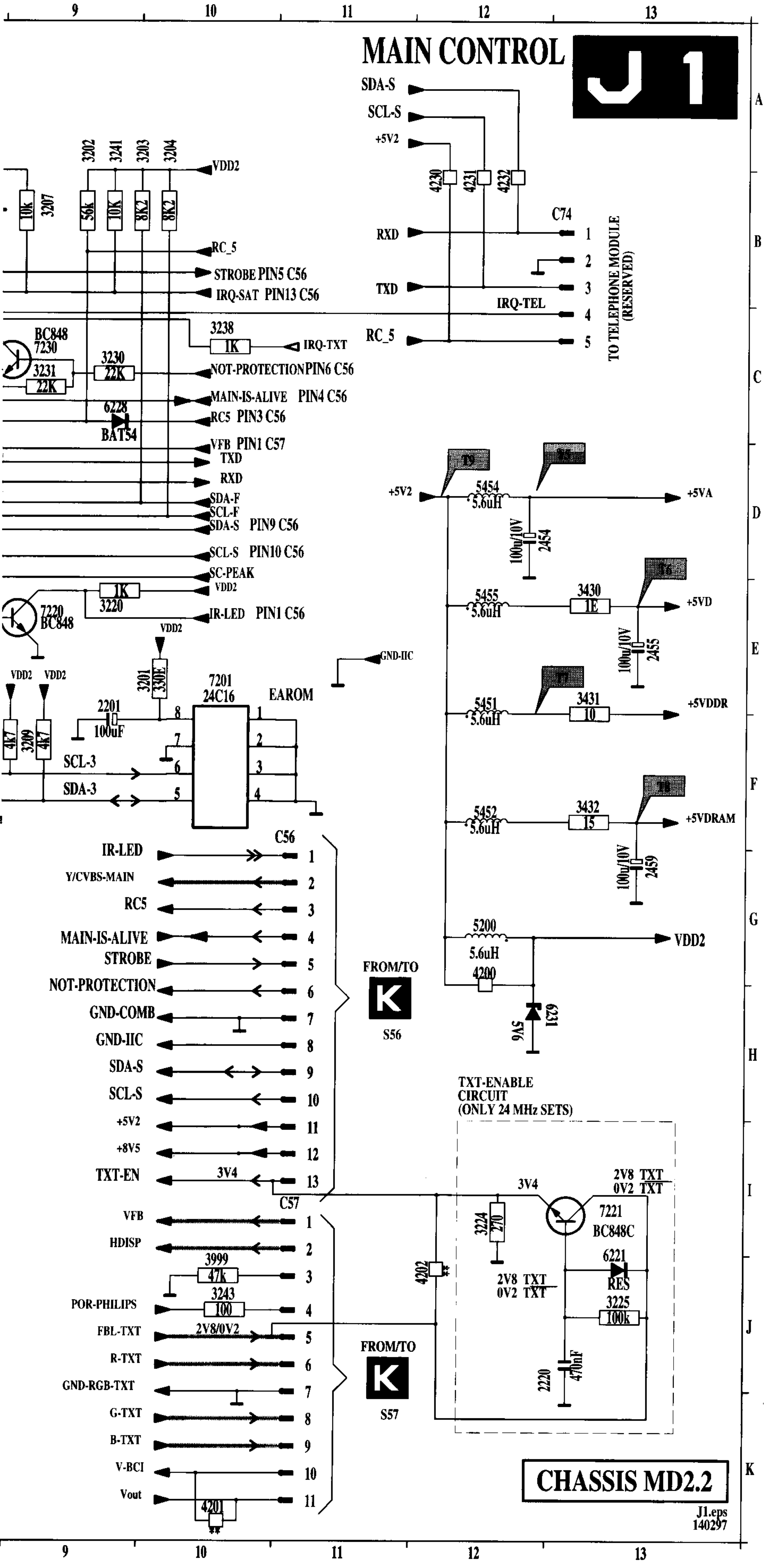

8
9
10
11
12
13
I
A
B
C
D
E
F
G
H
I
+6V
+12V
2776
18n
2779
100n
3777
68K
8
5
7
LM833
7772
6
4
LIMITER
LEFT
3757
5K6
2759
10u
3758
100k
+6V
7771
BC848B
3779
5K6
+6V
3778
1K
2777
470pF
3756
3K3
3776
56k
6775
1N4148
L
3780
180
3781
180
L-DBE
HEF4053
7774
6
7
8
9
4
10
15
11
14
16
+12V
3764
10K
2780
2n2
+12V
B26
11V5
1
2
3
FROM
U26
H2
INT = 0V
EXT = 5V
7773
BC848B
3795
10k
3765
100k
3796
10K
DBE-COMMAND
R
3782
180
3783
180
R-DBE
2762
100n
+12V
2781
2n2
6V
+12V
18n
2789
100n
8
5
7
LM833
7787
6
4
LIMITER
RIGHT
3794
5K6
3793
1K
2790
470pF
790
4148
CHASSIS MD2
CL66532022/020,Idbe
050396

2758	C 8
2759	B 9
2760	E 5
2761	D 5
2762	F 9
2763	B 7
2766	D 3
2767	E 3
2769	A 4
2770	A 5
2775	B 6
2776	A10
2777	C11
2779	A11
2780	D11
2781	F11
2783	H 7
2784	G 5
2785	G 5
2788	G 8
2789	G 9
2790	H 9
2798	G 3
2799	G 3
3752	E 3
3753	F 3
3754	F 3
3755	C 7
3756	C 8
3757	B 8
3758	B 9
3759	B 7
3761	D 6
3762	E 6
3764	D10
3765	E10
3766	D 3
3767	E 3
3769	A 6
3770	A 5
3771	B 5
3772	B 4
3773	C 5
3774	D 6
3775	B 6
3776	C 9
3777	A 9
3778	C10
3779	B11
3780	D11
3781	D11
3782	F11
3783	F11
3784	G 6
3785	G 5
3786	H 5
3787	H 5
3788	I 6
3789	I 6
3790	H 7
3791	I 7
3792	G 8
3793	H 8
3794	H 9
3795	E12
3796	E11
3798	F 3
3799	G 3
3999	H 3
4760	D 8
4761	G 8
6775	C10
6790	I 8
7770	C 5
7771	B 8
7772	B11
7772	B 7
7773	E10
7774	D 8
7780	I 5
7787	H 9
7787	H 7
9705	C 7
B26	D12
L20	D 2

Platine TXT & Commande

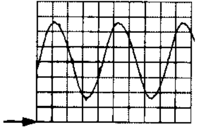

J 1
MAIN CONTROL
* 24MHz
** 12MHz
* ONLY IN CASE 24MHz 3rd OVERTONE X-TAL
5V6 zeners BZT55-C5V6
MICRO PROCESSOR
P90CE201ABB
7200
1200
**12MHz
* 24MHz
3206 6k8
3200 **220 * 470
2204 **22pF * 18pF
2205 **15pF * 18pF
XTAL2
XTAL1
CLOCK
RESET
WD TIME
CPU
DATA BUFFER
INTERUPT
ADDRESS ENCODER
3-TIMER
UART
IIC-F
IIC-S
EXT-I/O
GP-I/O
CONTROL
RWN
CSRAMN
CSROMN
VDD1
VDD2
VSS1
VSS2
2203 100n
2200 10uF
INT0N
INT1N
INT2N
INT3N
INT4N
INT5N
INT6N
INT7N
T1
T2
TXD
RXD
SDA2
SCL2
SDA1
SCL1
A23
A22
A21
A20
GP0
GP1
GP2
GP3
GP4
GP5/T1
3236
3237 1K
3233**
3256 220
3255 1k
3217 RES
3239
3240 220
3242 220
3250 220
3251 220
3252 220
3253 220
3254 220
3218 1K
3219 4K7
3232 4K7
DWE
TP
SCL-3
3208
6219 5V6
6220 5V6
6234 RES
6233 5V6
6225 5V6
6226 RES
6229 5V6
6230 5V6
VDD2
5V
6227 3V3
3216 10K
3215 470K
3205 47k
7215 BC858
7216 PMBT2369
7217 BC848B
7218 BC848B
3223 220
3222 1k
3221 180
2209 1uF
3214 4K7
2210 1n
POR-PHILIPS
0V7
0V
SCL-3
EPG SETS ONLY
7203 74F00
2208 100nF
&
4V5
0V1
A20
CSROMN
7202
EPROM
M27C4001
ADDRESS DECODER
ROM MEMORY
BUFFER
2202 100nF
GND
VDD
/CE
/OE
D0 D1 D2 D3 D4 D5 D6 D7
A0 A1 A2 A3 A4 A5 A6 A7 A8 A9 A10 A11 A12 A13 A14 A15 A16 A17 A18 A19
RAM
7206 MSM5165RS/JS
7207 HY62256ALJ-70
RAM-MEMORY
/WE
/CE1
NC.
2206 100nF
7xxx Am29F040
FLASH-MEMORY
2207 100nF
4V1
0V6 5V 2V6 4V6 0V5 5V 0V7 0V7 4V5 3V7 3V4 5V 4V5 4V5 2V4 3V3 2V7 1V 2V9
1V6 1V8 1V4 1V4 1V5 1V3 1V7 1V2
1 2 3 4 5 6 7 8
A B C D E F G H I J K

MAIN CONTROL J 1

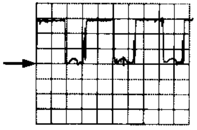

9
10
11
12
13
A
B
C
D
E
F
G
H
I
J
K
SDA-S
SCL-S
+5V2
4230
4231
4232
C74
RXD
TXD
IRQ-TEL
RC_5
1
2
3
4
5
TO TELEPHONE MODULE (RESERVED)
3202
3241
3203
3204
VDD2
10K
3207
56K
10K
8K2
8K2
RC_5
STROBE PIN5 C56
IRQ-SAT PIN13 C56
3238
1K
IRQ-TXT
BC848
7230
3230
22K
3231
22K
NOT-PROTECTIONPIN6 C56
MAIN-IS-ALIVE PIN4 C56
6228
BAT54
RC5 PIN3 C56
VFB PIN1 C57
TXD
RXD
SDA-F
SCL-F
SDA-S PIN9 C56
SCL-S PIN10 C56
SC-PEAK
1K
3220
VDD2
7220
BC848
IR-LED PIN1 C56
VDD2
GND-IIC
3201
330E
7201
24C16
EAROM
2201
100uF
VDD2
VDD2
4K7
3209
4K7
SCL-3
SDA-3
8
7
6
5
1
2
3
4
T9
T5
+5V2
5454
5.6uH
+5VA
100u/10V
2454
T6
5455
5.6uH
3430
1E
+5VD
100u/10V
2455
T7
5451
5.6uH
3431
10
+5VDDR
T8
5452
5.6uH
3432
15
+5VDRAM
100u/10V
2459
5200
5.6uH
VDD2
4200
6231
5V6
C56
IR-LED
Y/CVBS-MAIN
RC5
MAIN-IS-ALIVE
STROBE
NOT-PROTECTION
GND-COMB
GND-IIC
SDA-S
SCL-S
+5V2
+8V5
TXT-EN
3V4
FROM/TO
K
S56
C57
VFB
HDISP
3999
47K
3243
100
POR-PHILIPS
FBL-TXT
2V8/0V2
R-TXT
GND-RGB-TXT
G-TXT
B-TXT
V-BCI
Vout
4201
FROM/TO
K
S57
TXT-ENABLE CIRCUIT (ONLY 24 MHz SETS)
3V4
2V8 TXT
0V2 TXT
3224
270
7221
BC848C
6221
RES
4202
2V8 TXT
0V2 TXT
3225
100k
2220
470nF
CHASSIS MD2.2
J1.eps
140297

1200	A 3
2200	B 7
2201	E 9
2202	F 7
2203	B 6
2204	A 3
2205	A 4
2206	I 7
2207	I 1
2208	F 2
2209	B 2
2210	C 3
2220	J13
2454	D12
2455	E13
2459	G13
3200	B 4
3201	E10
3202	A 9
3203	A10
3204	A10
3205	B 2
3206	B 3
3207	B 9
3208	F 8
3209	F 9
3214	C 3
3215	B 2
3216	B 1
3217	C 7
3218	E 8
3219	E 7
3220	E 9
3221	C 1
3222	C 1
3223	B 1
3224	I12
3225	J13
3230	C 9
3231	C 9
3232	E 7
3233	C 7
3236	B 7
3237	C 7
3238	C10
3239	C 7
3240	D 7
3241	A 9
3242	D 8
3243	J10
3250	D 7
3251	D 7
3252	D 7
3253	D 7
3254	E 7
3255	C 7
3256	C 7
3430	E13
3431	E13
3432	F13
3999	J10
4200	G12
4201	K10
4202	J12
4230	B12
4231	B12
4232	B12
5200	G12
5451	E12
5452	F12
5454	D12
5455	E12
6219	A 7
6220	A 7
6221	J13
6225	A 8
6226	A 8
6227	B 1
6228	C 9
6229	A 8
6230	A 8
6231	H12
6233	A 8
6234	A 7
7200	A 4
7201	E10
7202	F 5
7203	F 3
7204	K 1
7206	I 5
7207	K 5
7215	B 3
7216	B 1
7217	B 1
7218	C 1
7220	E 9
7221	I13
7230	C 9
C56	F10
C57	I11
C74	B12

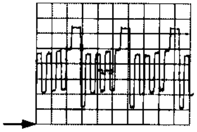
C1 (CLOCK)


0.5V / div DC
0.2ms / div

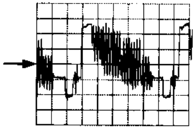
T2c (B_TXT)


0.2V / div DC
10μs / div

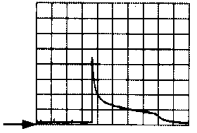
C2 OFF-ON(PORP)


1V / div DC
50ms / div

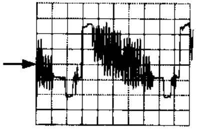
T3 (CVBS)


0.2V / div AC
10μs / div

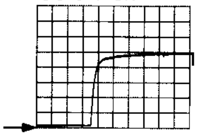
C2 ON-OFF(PORP)


1V / div DC
50ms / div

T4 (Y/CVBS_MAIN)


0.2V / div AC
10μs / div

C3 OFF-ON


1V / div DC
0.2s / div

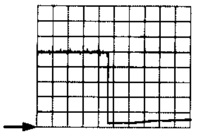
T5 (+5V A)
5V DC

T6 (+5V D)
5V DC

T7 (+5V DDR)
5V DC

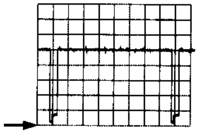
T8 (+5V DRAM)
5V DC

C3 ON-OFF

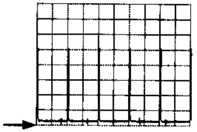

1V / div DC
0.2s / div

T9 (+5V2)
5V DC

C4 (MAIN IS ALIVE) see § 6.5.1

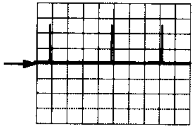

1V / div DC
0.1s / div

T16 (VD)

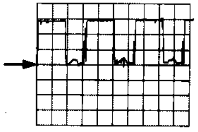

1V / div DC
5ms / div

T1 (FBL_TXT)
TXT = 2V2 DC
NO TXT = 0V DC

T17 (IRQ_TXT)

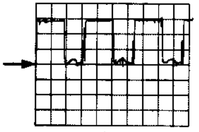

2V / div DC
10ms / div

T2a (R_TXT)


0.2V / div DC
10μs / div

→ = 0V

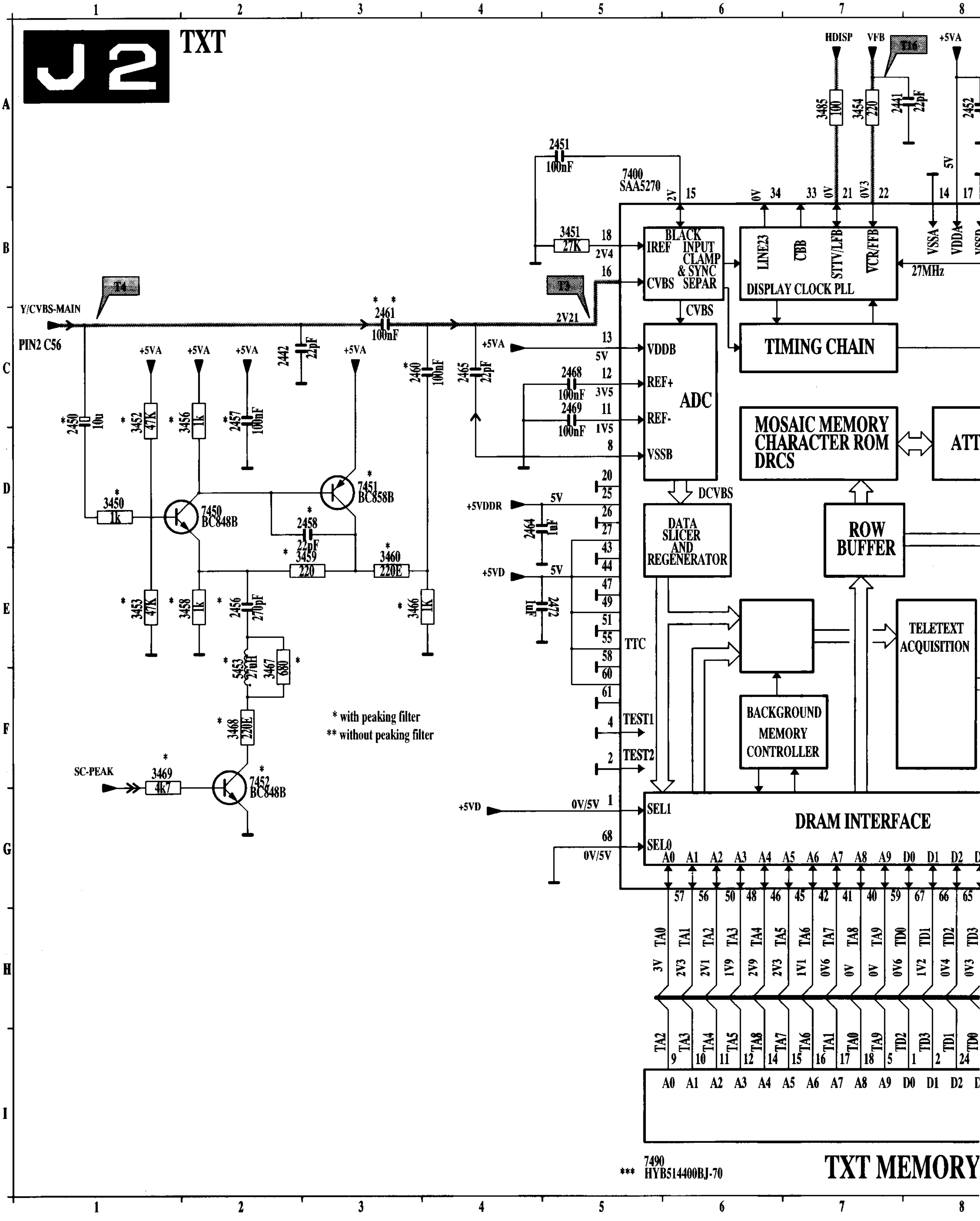
T2b (G_TXT)


0.2V / div DC
10μs / div

OSC_J1-2.AI
250297

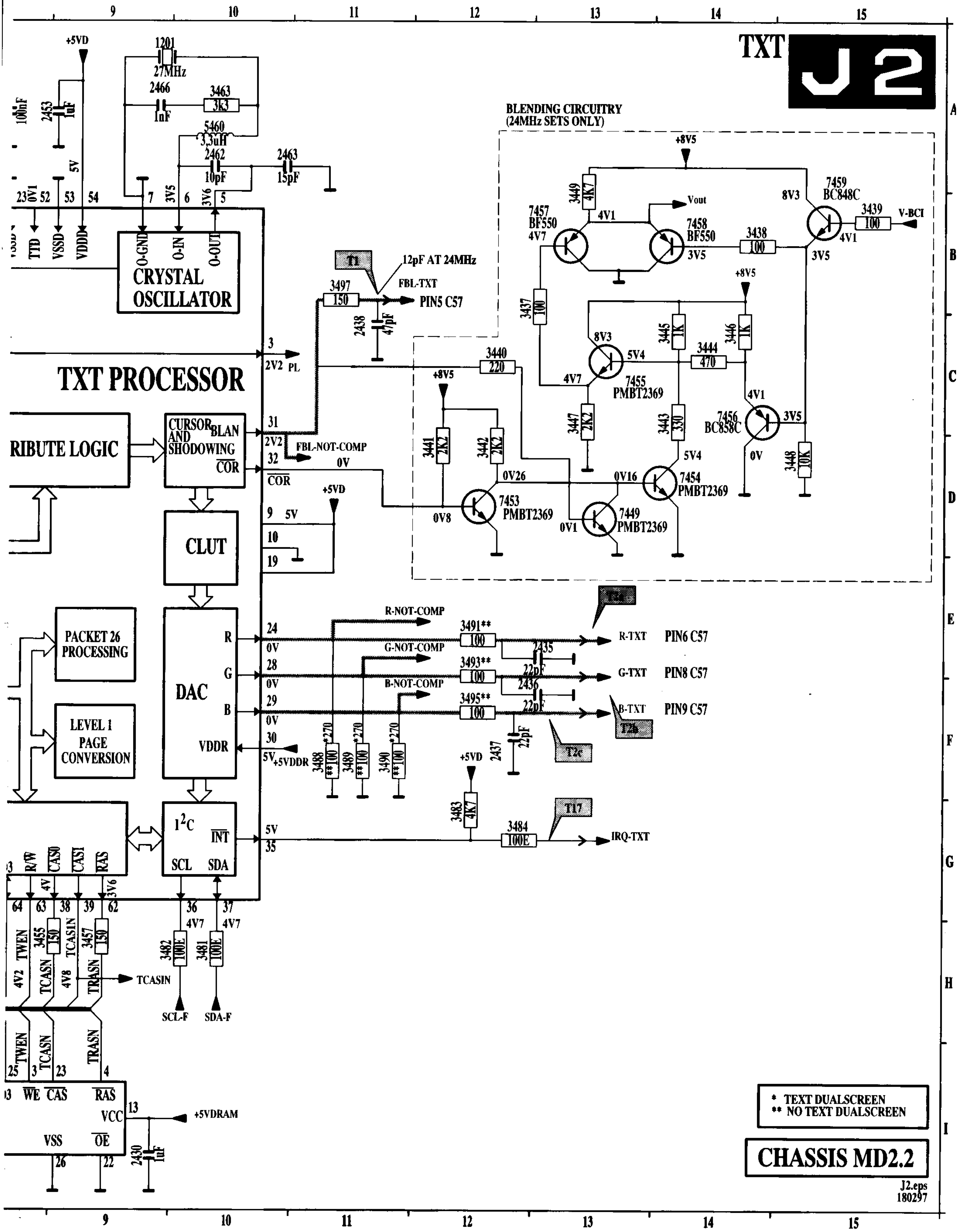
TXT & Control panel (TXT part) /

1201	A 9
2430	I 9
2435	E13
2436	F12
2437	F12
2438	C11
2441	A 7
2442	C 2
2450	C 1
2451	A 5
2452	A 8
2453	A 8
2456	E 2
2457	C 2
2458	D 3
2460	C 3
2461	C 3
2462	A10
2463	A10
2464	D 4
2465	C 4
2466	A 9
2468	C 5
2469	C 5
2472	E 5
3437	B12
3438	B14
3439	B15
3440	C12
3441	D12
3442	D12
3443	C14
3444	C14
3445	C14
3446	C14
3447	C13
3448	D15
3449	A13
3450	D 1
3451	B 5
3452	C 1
3453	E 1
3454	A 7
3455	H 8
3456	C 2
3457	H 9
3458	E 2
3459	E 3
3460	
3463	
3466	
3467	

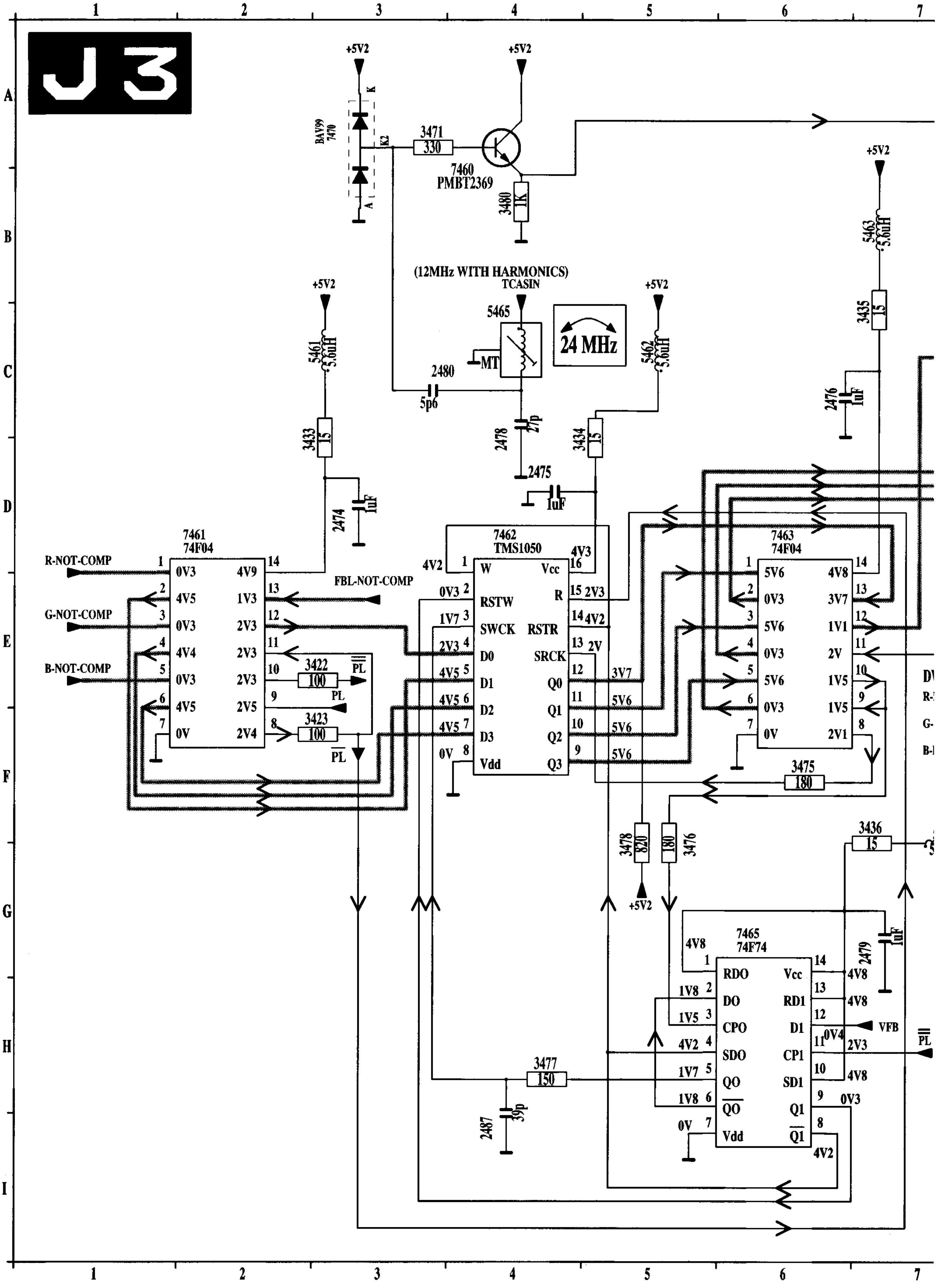

J2
TXT
1 2 3 4 5 6 7 8
A B C D E F G H I
HDISP
VFB
T16
+5VA
3485 100
3454 220
2441 22pF
2452
5V
2451 100nF
7400 SAA5270
2V 15
0V 34
33 0V 21
0V3 22
14 17
3451 27K
18 2V4
16
BLACK INPUT CLAMP & SYNC SEPAR
IREF
CVBS
LINE23
CBB
STTV/LFB
VCR/FFB
DISPLAY CLOCK PLL
VSSA
VDDA
27MHz
T4
T3
Y/CVBS-MAIN
PIN2 C56
2461 100nF
2442 22pF
2V21
CVBS
+5VA
13 5V
VDDB
TIMING CHAIN
2460 100nF
2465 22pF
2468 100nF 12 3V5
REF+
ADC
2469 100nF 11 1V5
REF-
8
VSSB
MOSAIC MEMORY CHARACTER ROM DRCS
ATT
2450 10u
3452 47K
3456 1k
2457 100nF
7451 BC858B
3450 1k
7450 BC848B
2458 22pF
3459 220
3460 220E
3453 47K
3458 1k
2456 270pF
3466 1K
5453 27uH
3467 680
3468 220E
* with peaking filter
** without peaking filter
SC-PEAK
3469 4k7
7452 BC848B
20 25 26 27 43 44 47 49 51 55 58 60 61
+5VDDR 5V
2464 1uF
+5VD 5V
2472 1uF
DCVBS
DATA SLICER AND REGENERATOR
ROW BUFFER
TTC
TELETEXT ACQUISITION
BACKGROUND MEMORY CONTROLLER
4 TEST1
2 TEST2
+5VD 0V/5V 1
SEL1
DRAM INTERFACE
68 0V/5V
SEL0
A0 A1 A2 A3 A4 A5 A6 A7 A8 A9 D0 D1 D2
57 56 50 48 46 45 42 41 40 59 67 66 65
TA0 TA1 TA2 TA3 TA4 TA5 TA6 TA7 TA8 TA9 TD0 TD1 TD2 TD3
3V 2V3 2V1 1V9 2V9 2V3 1V1 0V6 0V 0V 0V6 1V2 0V4 0V3
TA2 TA3 TA4 TA5 TA8 TA7 TA6 TA1 TA0 TA9 TD2 TD3 TD1 TD0
9 10 11 12 14 15 16 17 18 5 1 2 24
A0 A1 A2 A3 A4 A5 A6 A7 A8 A9 D0 D1 D2
7490
*** HYB514400BJ-70
TXT MEMORY

TXT & Control-Platine / Platine TXT & Commande

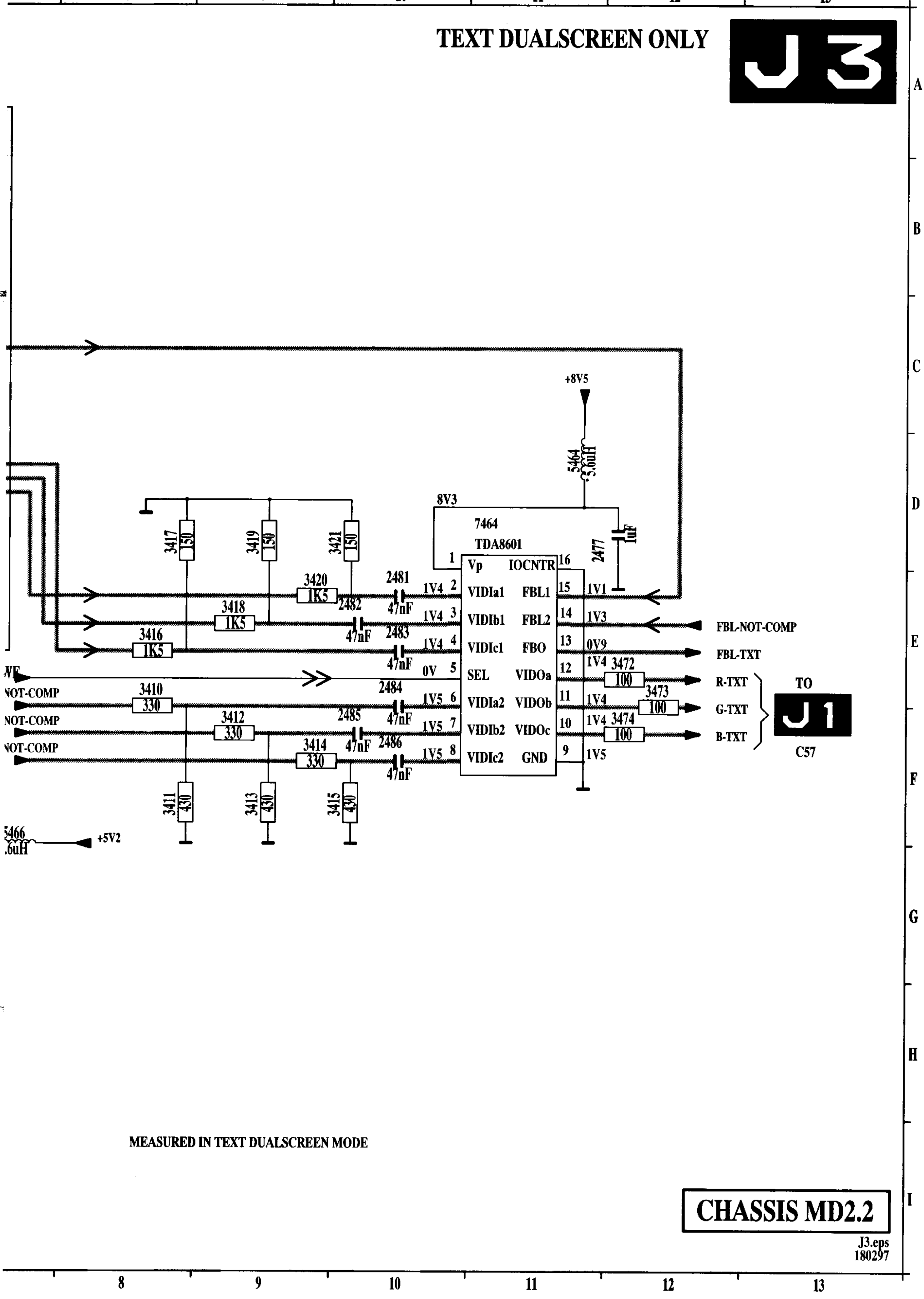
	E 3	3468	F 2	3483	G12	3489	F11	3495*	F12	7400	A 5	7452	F 2	7456	C14	7490	I 5
	A10	3469	F 1	3484	G12	3490	F11	3497	B11	7449	D13	7453	D12	7457	B12		
	E 3	3481	H10	3485	A 7	3491*	E12	5453	E 2	7450	D 2	7454	D14	7458	B14		
	E 2	3482	H10	3488	F11	3493*	E12	5460	A10	7451	D 3	7455	C13	7459	A15		



9
10
11
12
13
14
15
TXT
J2
A
B
C
D
E
F
G
H
I
+5VD
1201
27MHz
2466
1nF
3463
3k3
5460
3,3uH
2462
10pF
2463
15pF
2453
1uF
100nF
5V
23
0V1
52
53
54
7
3V5
6
3V6
5
TTD
VSSD
VDDD
0-GND
0-IN
0-OUT
CRYSTAL OSCILLATOR
TXT PROCESSOR
RIBUTE LOGIC
CURSOR AND SHODOWING
BLAN
COR
CLUT
DAC
R
G
B
VDDR
PACKET 26 PROCESSING
LEVEL 1 PAGE CONVERSION
I²C
INT
SCL
SDA
3
2V2
PL
31
2V2
FBL-NOT-COMP
32
0V
COR
9
5V
10
19
24
0V
28
0V
29
0V
30
5V
+5VDDR
5V
35
T1
12pF AT 24MHz
FBL-TXT
3497
150
PIN5 C57
2438
47pF
BLENDING CIRCUITRY (24MHz SETS ONLY)
+8V5
3449
4K7
Vout
7457
BF550
4V7
4V1
7458
BF550
3V5
3438
100
7459
BC848C
8V3
3439
100
V-BCI
4V1
3V5
+8V5
3437
100
3445
1K
3446
1K
8V3
5V4
3444
470
3440
220
4V7
7455
PMBT2369
+8V5
3447
2K2
3443
330
4V1
7456
BC858C
3V5
5V4
0V
3448
10K
3441
2K2
3442
2K2
0V26
0V16
7454
PMBT2369
7453
PMBT2369
0V8
0V1
7449
PMBT2369
T2a
R-NOT-COMP
3491**
100
R-TXT
PIN6 C57
2435
22pF
G-NOT-COMP
3493**
100
G-TXT
PIN8 C57
2436
22pF
B-NOT-COMP
3495**
100
B-TXT
PIN9 C57
22pF
T2b
2437
22pF
T2c
3488
*270
**100
3489
*270
**100
3490
*270
**100
+5VD
3483
4K7
T17
3484
100E
IRQ-TXT
R/W
CAS0
CAS1
RAS
4V
3V6
64
63
38
39
62
TWEN
3455
150
TCASIN
3457
150
4V2
TCASN
4V8
TRASN
TCASIN
36
4V7
37
4V7
3482
100E
3481
100E
SCL-F
SDA-F
TWEN
TCASN
TRASN
25
3
23
4
WE
CAS
RAS
VCC
13
+5VDRAM
VSS
OE
26
22
2430
1nF
* TEXT DUALSCREEN
** NO TEXT DUALSCREEN
CHASSIS MD2.2
J2.eps
180297


J3
1
2
3
4
5
6
7
A
B
C
D
E
F
G
H
I
+5V2
BAV99
7470
K
K2
A
3471
330
7460
PMBT2369
3480
1K
5463
5.6uH
3435
15
(12MHz WITH HARMONICS)
TCASIN
5465
MT
24 MHz
5461
5.6uH
5462
5.6uH
2480
5p6
2478
27p
2475
1uF
3433
15
3434
15
2474
1uF
2476
1uF
7461
74F04
R-NOT-COMP
G-NOT-COMP
B-NOT-COMP
FBL-NOT-COMP
0V3
4V5
0V3
4V4
0V3
4V5
0V
4V9
1V3
2V3
2V3
2V3
2V5
2V4
3422
100
3423
100
PL
PL
PL
7462
TMS1050
W
RSTW
SWCK
D0
D1
D2
D3
Vdd
Vcc
R
RSTR
SRCK
Q0
Q1
Q2
Q3
4V2
0V3
1V7
2V3
4V5
4V5
4V5
0V
4V3
2V3
4V2
2V
3V7
5V6
5V6
5V6
7463
74F04
5V6
0V3
5V6
0V3
5V6
0V3
0V
4V8
3V7
1V1
2V
1V5
1V5
2V1
3475
180
3478
820
3476
180
3436
15
DV
R-
G-
B-
7465
74F74
RDO
DO
CPO
SDO
QO
QO
Vdd
Vcc
RD1
D1
CP1
SD1
Q1
Q1
4V8
1V8
1V5
4V2
1V7
1V8
0V
4V8
4V8
0V4
2V3
4V8
0V3
4V2
VFB
PL
2479
1uF
3477
150
2487
39p

TXT & Control-Platine / Platine TXT & Commande

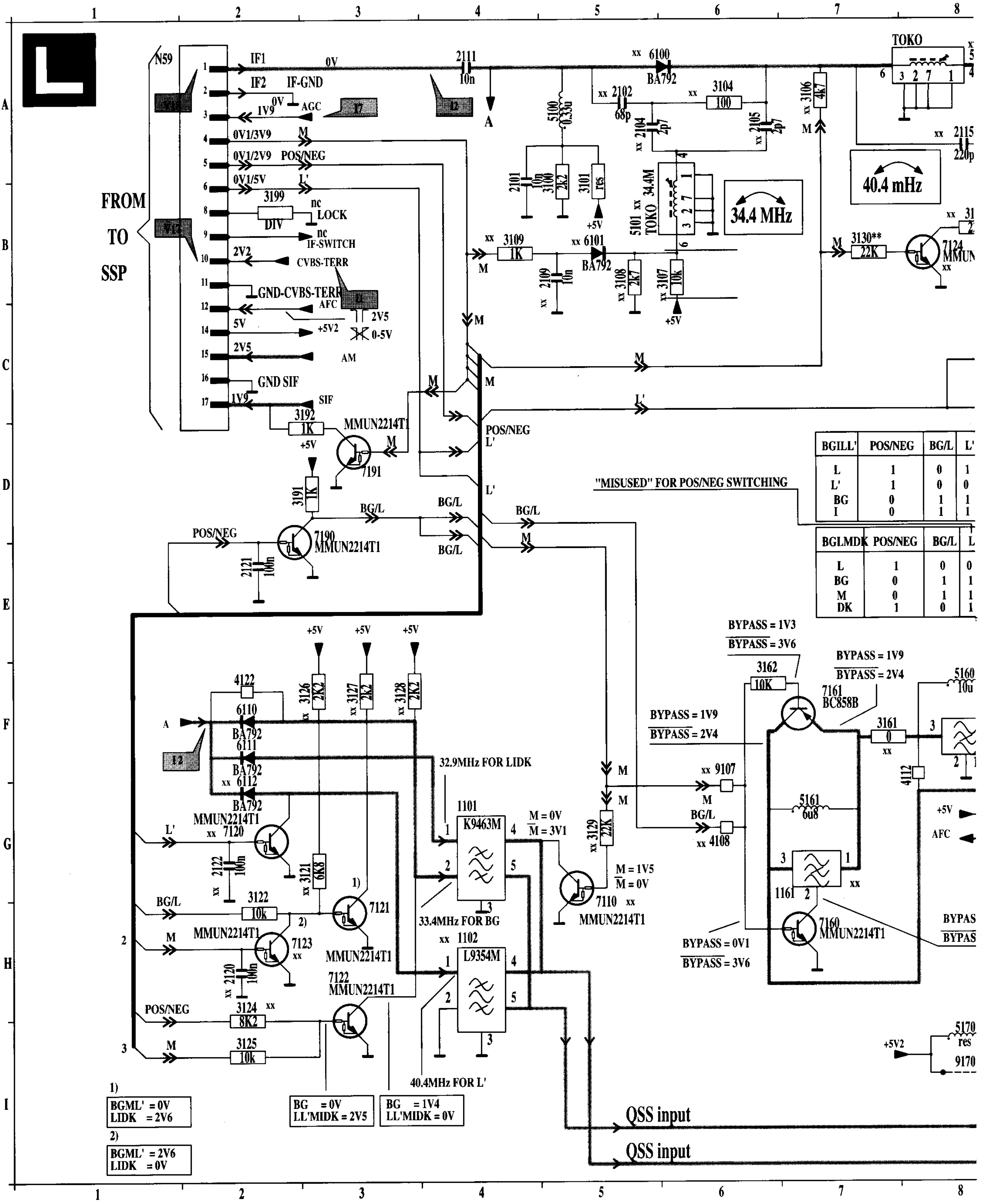


8
9
10
11
12
13
A
B
C
D
E
F
G
H
I
TEXT DUALSCREEN ONLY
J 3
+8V5
5464
5.6uH
8V3
7464
TDA8601
2477
1uF
3417
150
3419
150
3421
150
3420
1K5
3418
1K5
3416
1K5
2481
2482
2483
2484
2485
2486
47nF
1V4
1V4
1V4
0V
1V5
1V5
1V5
1 Vp
2 VIDIa1
3 VIDIb1
4 VIDIc1
5 SEL
6 VIDIa2
7 VIDIb2
8 VIDIc2
16 IOCNTR
15 FBL1
14 FBL2
13 FBO
12 VIDOa
11 VIDOb
10 VIDOc
9 GND
1V1
1V3
0V9
1V4
1V4
1V4
1V5
3472
100
3473
100
3474
100
FBL-NOT-COMP
FBL-TXT
R-TXT
G-TXT
B-TXT
TO
J 1
C57
NOT-COMP
NOT-COMP
NOT-COMP
3410
330
3412
330
3414
330
3411
430
3413
430
3415
430
5466
.6uH
+5V2
MEASURED IN TEXT DUALSCREEN MODE
CHASSIS MD2.2
J3.eps
180297

2474	D 3
2475	D 4
2476	C 6
2477	D11
2478	C 4
2479	G 7
2480	C 3
2481	E10
2482	E10
2483	E10
2484	E10
2485	F10
2486	F10
2487	I 4
3410	E 8
3411	F 8
3412	F 9
3413	F 9
3414	F 9
3415	F10
3416	E 8
3417	D 8
3418	E 9
3419	D 9
3420	E 9
3421	D10
3422	E 3
3423	F 3
3433	C 3
3434	C 5
3435	C 7
3436	F 7
3471	A 3
3472	E12
3473	E12
3474	F12
3475	F 6
3476	F 5
3477	H 4
3478	F 5
3480	B 4
5461	C 3
5462	C 5
5463	B 7
5464	D11
5465	C 4
5466	F 7
7460	B 4
7461	D 2
7462	D 4
7463	D 6
7464	D11
7465	G 6
7470	A 3

IF module / Zwischenfrequenz-Modul / Module FI

1100	A 9	2100	A10	2105	A 6	2115	A 8	2122	G 2	2144	B10	2167	H10	3101	A 5	3109	B 4	3126	F 3	3131	B 8	3151	F10	3166	
1101	G 4	2101	A 4	2109	B 5	2116	A 9	2123	E10	2145	D10	2168	H10	3104	A 6	3121	G 3	3127	F 3	3140	B 9	3160	F10	3191	
1102	H 4	2102	A 5	2110	B10	2117	A 8	2140	B 8	2150	F 9	2170	I 9	3106	A 7	3122	G 2	3128	F 3	3141	B10	3161	F 7	3192	
1160	F 8	2103	A10	2111	A 4	2120	H 2	2141	B 9	2165	G 8	2171	I 9	3107	B 6	3124	H 2	3129	G 5	3146	C10	3162	F 6	3199	
1161	G 7	2104	A 5	2112	A10	2121	E 2	2142	B 9	2166	H 9	3100	A 5	3108	B 5	3125	I 2	3130*	B 7	3150	F10	3165	G 8	4108	


1
2
3
4
5
6
7
8
A
B
C
D
E
F
G
H
I
L
N59
FROM
TO
SSP
IF1
0V
IF2
IF-GND
0V
1V9
AGC
0V1/3V9
M
0V1/2V9
POS/NEG
0V1/5V
L'
3199
DIV
nc
LOCK
nc
IF-SWITCH
2V2
CVBS-TERR
GND-CVBS-TERR
AFC
2V5
5V
+5V2
0-5V
2V5
AM
GND SIF
1V9
SIF
3192
1K
+5V
MMUN2214T1
7191
3191
1K
POS/NEG
7190
MMUN2214T1
2121
100n
BG/L
BG/L
BG/L
POS/NEG
L'
L'
BG/L
M
2111
10n
A
xx 6100
BA792
5100
0.33u
xx 2102
68p
xx 3104
100
xx 2104
2p7
xx 2105
2p7
xx 3106
4k7
2101
10n
3100
2K2
3101
res
+5V
5101 xx
TOKO 34.4M
34.4 MHz
xx 3109
1K
M
2109
10n
xx 6101
BA792
xx 3108
2K7
xx 3107
10k
+5V
TOKO
xx 2115
220p
40.4 mHz
3130**
22K
7124
MMUN
xx
"MISUSED" FOR POS/NEG SWITCHING
+5V
+5V
+5V
4122
6110
BA792
6111
BA792
xx 6112
BA792
xx 3126
2K2
xx 3127
2K2
xx 3128
2K2
L'
MMUN2214T1
xx 7120
xx 2122
100n
xx 3121
6K8
BG/L
3122
10k
1)
7121
2)
M
MMUN2214T1
7123
xx
MMUN2214T1
xx 2120
100n
7122
MMUN2214T1
POS/NEG
3124
8K2
xx
M
3125
10k
32.9MHz FOR LIDK
1101
K9463M
33.4MHz FOR BG
xx 1102
L9354M
40.4MHz FOR L'
M = 0V
$\overline{M}$ = 3V1
xx 3129
22K
M = 1V5
$\overline{M}$ = 0V
7110 xx
MMUN2214T1
BYPASS = 1V3
$\overline{BYPASS}$ = 3V6
3162
10K
BYPASS = 1V9
$\overline{BYPASS}$ = 2V4
7161
BC858B
BYPASS = 1V9
$\overline{BYPASS}$ = 2V4
xx 9107
M
BG/L
xx 4108
5161
6u8
3161
0
xx
5160
10u
4112
+5V
AFC
1161
xx
7160
MMUN2214T1
BYPASS = 0V1
$\overline{BYPASS}$ = 3V6
BYPAS
$\overline{BYPAS}$
+5V2
5170
res
9170
QSS input
QSS input

BGILL'	POS/NEG	BG/L	L'
L	1	0	1
L'	1	0	0
BG	0	1	1
I	0	1	1

BGLMDK	POS/NEG	BG/L	L
L	1	0	0
BG	0	1	1
M	0	1	1
DK	1	0	1

1)
BGML' = 0V
LIDK = 2V6

2)
BGML' = 2V6
LIDK = 0V

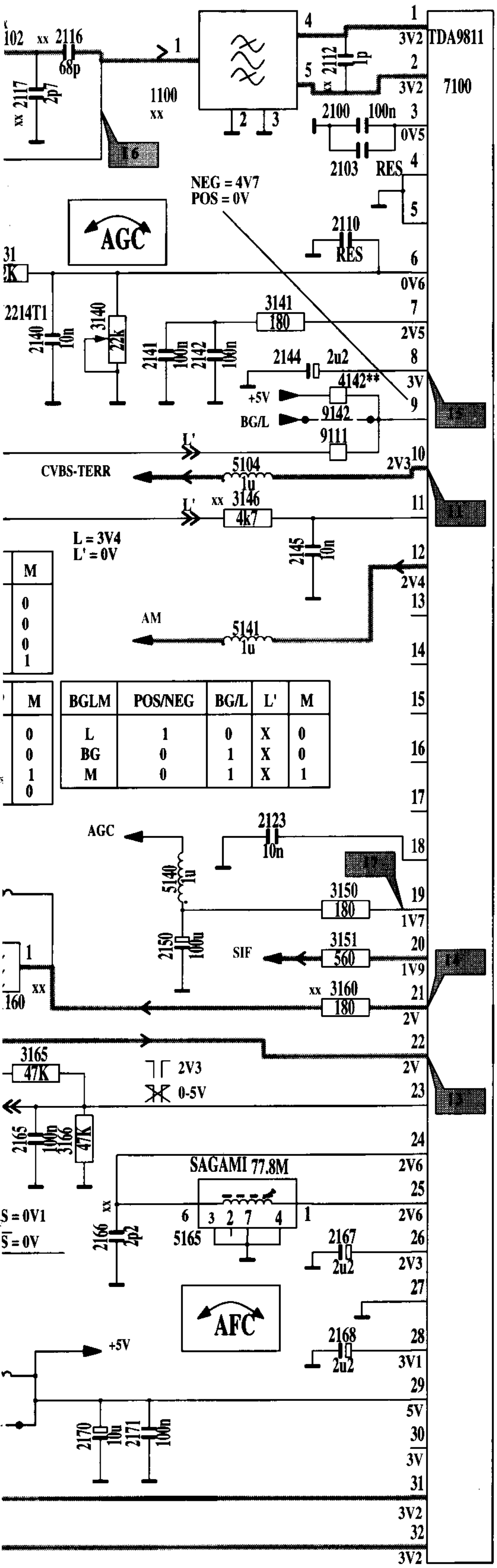
BG = 0V
LL'MIDK = 2V5

BG = 1V4
LL'MIDK = 0V

	G 9
	D 3
	C 3
	B 2
	G 6
4112	F 8
4122	F 2
4142*	C10
5100	A 5
5101	B 5
5102	A 8
5104	C10
5140	F 9
5141	D10
5160	F 8
5161	G 7
5165	H 9
5170	I 8
6100	A 6
6101	B 5
6110	F 2
6111	F 2
6112	G 2
7100	A11
7110	H 5
7120	G 2
7121	H 3
7122	H 3
7123	H 2
7124	B 8
7160	H 7
7161	F 7
7190	D 3
7191	D 3
9107	F 6
9111	C10
9142	C10
9170	I 8
N59	A 1

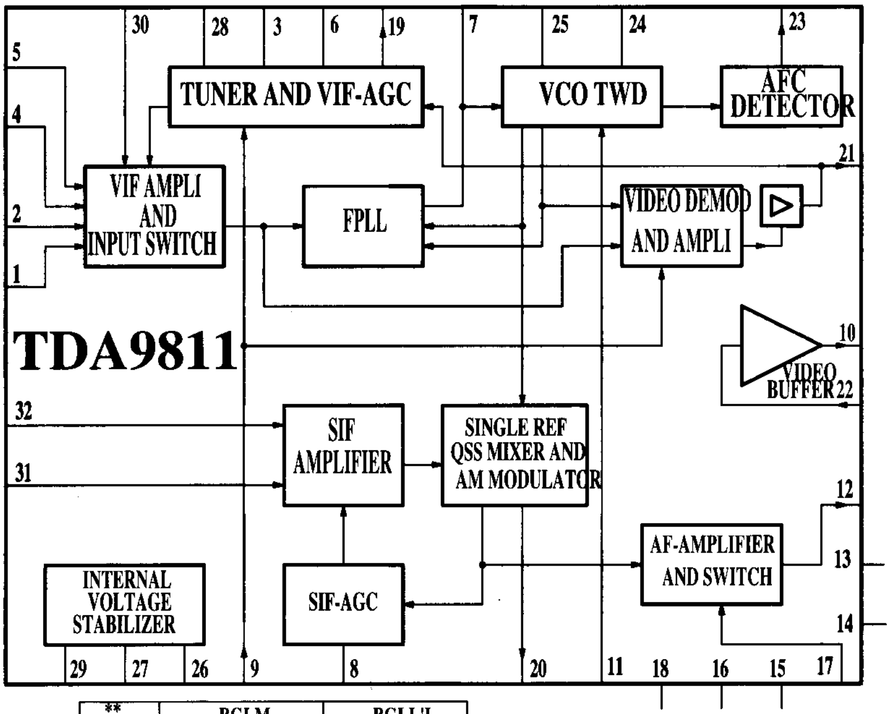
IF PANEL

L


9
10
11
12
13
14
15
102
xx 2116
68p
2117 2p7 xx
1100 xx
1
4
5
2
3
2112 1p xx
2100 100n
2103
RES
2110 RES
NEG = 4V7
POS = 0V
AGC
31
2K
2214T1
2140 10n
3140 22k
3141 180
2141 100n
2142 100n
2144 2u2
4142**
+5V
BG/L
9142
9111
L'
CVBS-TERR
5104 1u
xx 3146 4k7
2145 10n
L = 3V4
L' = 0V
AM
5141 1u
AGC
2123 10n
5140 1u
3150 180
2150 100u
SIF
3151 560
xx 3160 180
160 xx
3165 47K
2V3
0-5V
2165 100n
3166 47K
SAGAMI 77.8M
6 3 2 7 4 1
5165
2166 2p2 xx
S = 0V1
S̄ = 0V
2167 2u2
AFC
2168 2u2
+5V
2170 10u
2171 100n
TDA9811
7100
1 3V2
2 3V2
3 0V5
4 RES
5
6 0V6
7 2V5
8 3V
9
10 2V3
11
12 2V4
13
14
15
16
17
18
19 1V7
20 1V9
21 2V
22 2V
23
24
25 2V6
26 2V6
27 2V3
28
29 3V1
30 5V
31 3V
32 3V2
3V2

M
0
0
0
1

M	BGLM	POS/NEG	BG/L	L'	M
0	L	1	0	X	0
0	BG	0	1	X	0
1	M	0	1	X	1
0					


TDA9811
TUNER AND VIF-AGC
VCO TWD
AFC DETECTOR
VIF AMPLI AND INPUT SWITCH
FPLL
VIDEO DEMOD AND AMPLI
VIDEO BUFFER
SIF AMPLIFIER
SINGLE REF QSS MIXER AND AM MODULATOR
AF-AMPLIFIER AND SWITCH
INTERNAL VOLTAGE STABILIZER
SIF-AGC
30
28
3
6
19
7
25
24
23
5
4
2
1
21
10
22
32
31
12
13
14
29
27
26
9
8
20
11
18
16
15
17

**	BGLM	BGLL'I
1100	OFWG3956M	OFWG3953M
1102	-	OFWG9354M
1160	TPS5,5MW	TPS6,0MB
1161	TPS4,5MB	TPS5,5MW
2102	68pF	JUMPER
2104	2p7	-
2105	2p7	-
2109	10n	-
2112	-	
2115	JUMPER	330p
2116	-	56p
2117	-	2p2
2120	-	100n
2122	-	100n
3104	150	47
3106	4k7	-
3107	10K	-
3108	2k7	-
3109	1k	-
3121	-	6k8
3124	8k2	6k8
3126	-	2k2
3127	2k2	4k7
3128	2k2	4k7
3129	22k	-
3130	22k	-
3131	22k	-
3146	-	4k7
3160	180	220
4107	JUMPER	-
4108	-	4142
4142	-	-
5101	34,4MC	-
5102	-	40.4MC
6100	BA582	-
6101	BA582	-
6112	-	BA582
7110	MMUN2214T1	-
7120	-	MMUN2214T1
7123	-	MMUN2214T1
7124	MMUN2214T1	-

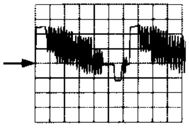
BGLMDK ; LIKE BGLM EXCEPT:	
1100	OFWG3953M
9111	IN
9142	NOT IN

CHASSIS MD2.2

L.eps
140297

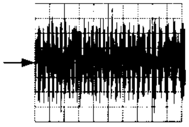
module / Zwi

I1 (CVBS_TERR)



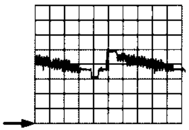
0.5V / div DC
10µs / div

I2 (IF1)



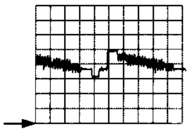
50mV / div DC
50µs / div

I3



0.5V / div DC
10µs / div

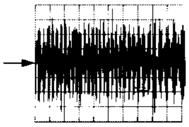
I4



0.5V / div DC
10µs / div

I5
3V DC

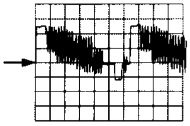
I6



50mV / div DC
50µs / div

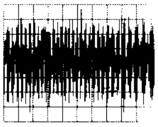
I7 (AGC)
1V9 DC

V17 (CVBS_TERR)



0.5V / div DC
10µs / div

V18 (IF1)

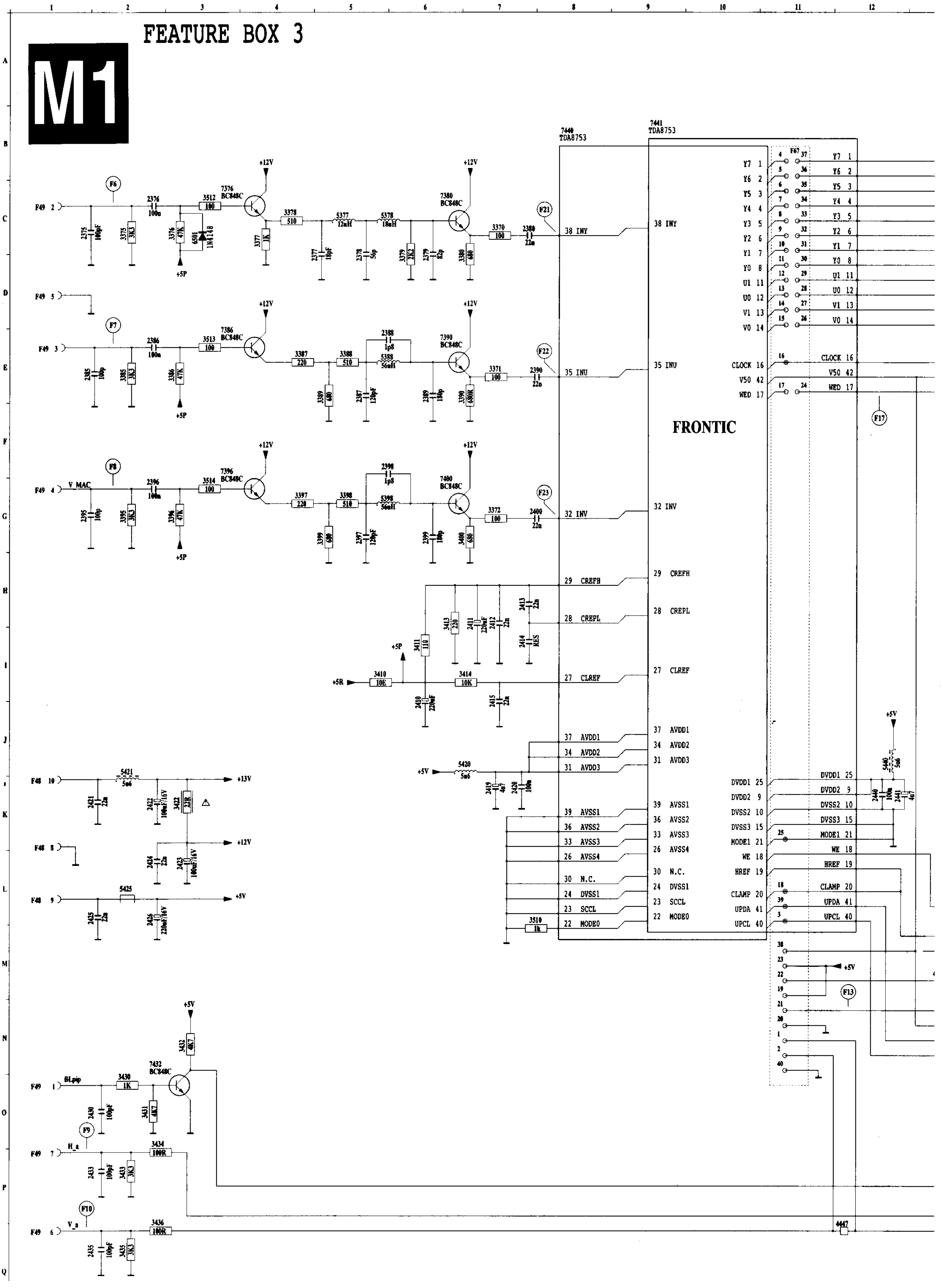


50mV / div DC
50µs / div

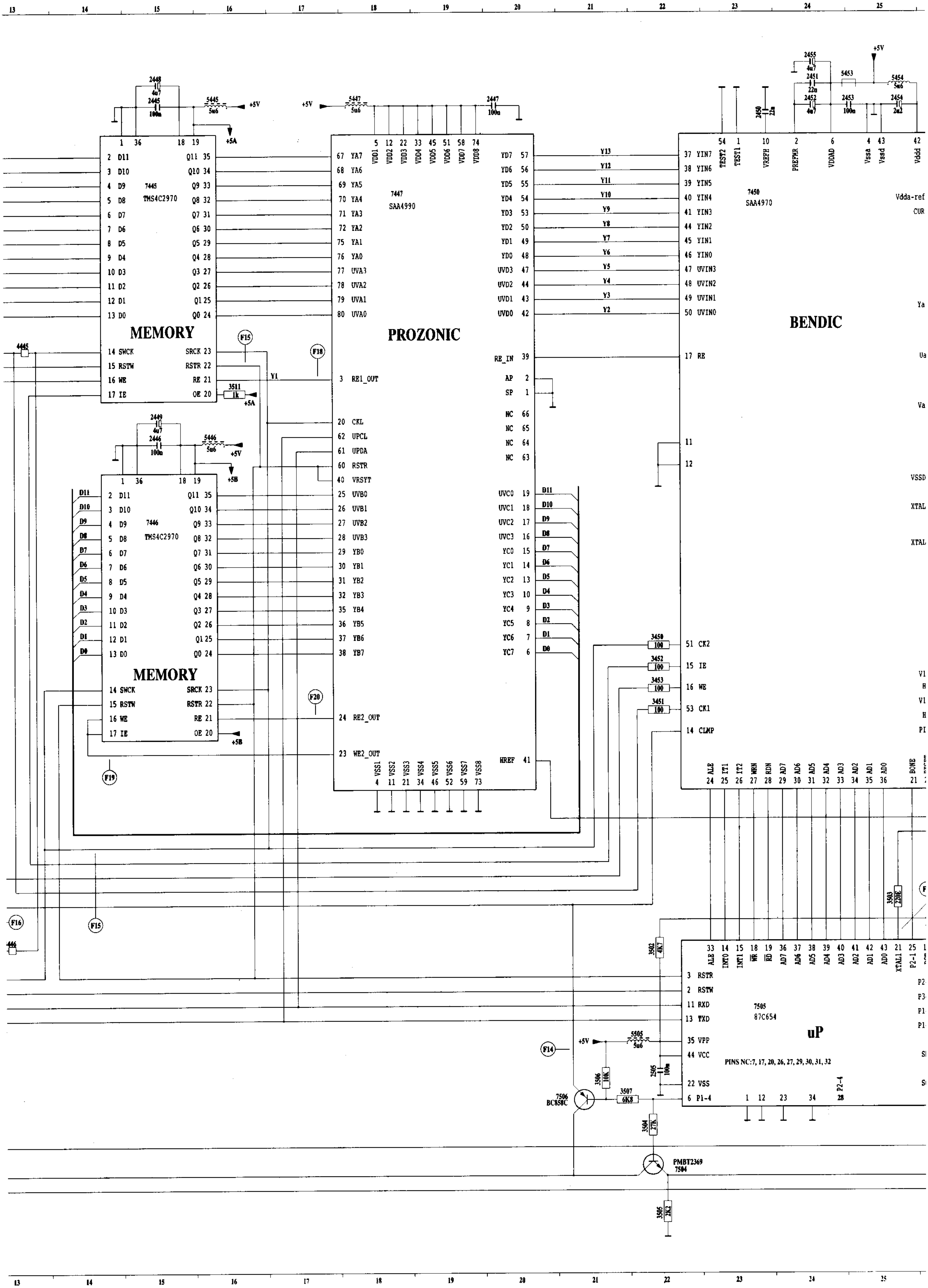
→ = 0V

OSC_L.AI
260297

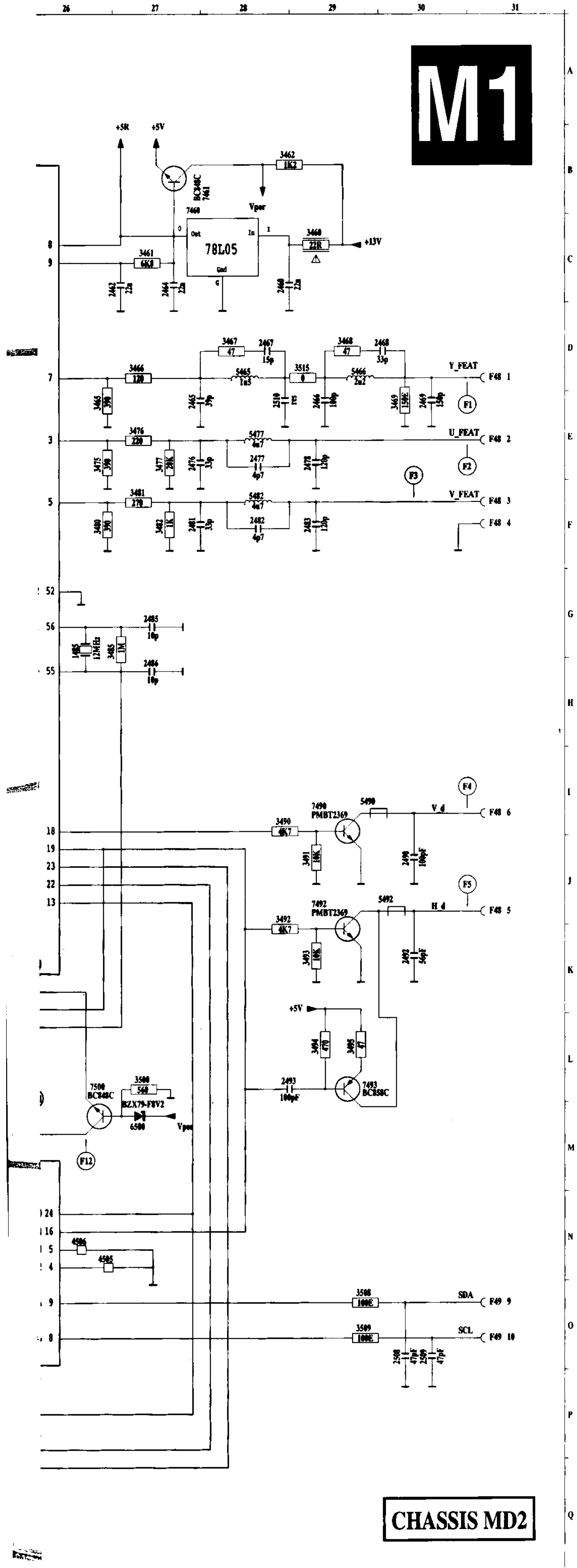
Feature Box (Digital Scan) panel /


FEATURE BOX 3
M1
7440 TDA8753
7441 TDA8753
FRONTIC
F49 2
F49 5
F49 3
F49 4
V MAC
F6
F7
F8
F21
F22
F23
F17
F13
F9
F10
F67
7376 BC848C
7380 BC848C
7386 BC848C
7390 BC848C
7396 BC848C
7400 BC848C
7432 BC848C
+12V
+5P
+5R
+5V
+13V
6501 1N4148
2375 100pF
3375 3K3
2376 100n
3376 47K
3512 100
3377 1K
3378 510
5377 12uH
5378 18uH
2377 18pF
2378 56p
3379 2K2
2379 82p
3380 680
3370 100
2380 22n
2385 100p
3385 3K3
2386 100n
3386 47K
3513 100
3387 220
3388 510
2388 1p8
5388 56uH
3389 680
2387 120pF
2389 180p
3390 680R
3371 100
2390 22n
2395 100p
3395 3K3
2396 100n
3396 47K
3514 100
3397 220
3398 510
2398 1p8
5398 56uH
3399 680
2397 120pF
2399 180p
3400 680
3372 100
2400 22n
3413 220
2411 220uF
2412 22n
2413 22n
2414 RES
3411 110
3410 10E
3414 10K
2410 220uF
2415 22n
5420 5u6
2419 4u7
2420 100n
38 INY
35 INU
32 INV
29 CREFH
28 CREPL
27 CLREF
37 AVDD1
34 AVDD2
31 AVDD3
39 AVSS1
36 AVSS2
33 AVSS3
26 AVSS4
30 N.C.
24 DVSS1
23 SCCL
22 MODE0
3510 1k
Y7 1
Y6 2
Y5 3
Y4 4
Y3 5
Y2 6
Y1 7
Y0 8
U1 11
U0 12
V1 13
V0 14
CLOCK 16
V50 42
WED 17
DVDD1 25
DVDD2 9
DVSS2 10
DVSS3 15
MODE1 21
WE 18
HREF 19
CLAMP 20
UPDA 41
UPCL 40
5440 5u6
2440 100n
2441 4u7
F48 10
5421 5u6
2421 22n
2422 100uF/16V
3422 22R
F48 8
2424 22n
2423 100uF/16V
F48 9
5425
2425 22n
2426 220uF/16V
F49 1
BLpip
3430 1K
2430 100pF
3431 4K7
3432 4K7
F49 7
H_a
3434 100R
2433 100pF
3433 3K3
F49 6
V_a
3436 100R
2435 100pF
3435 3K3
4447
]

Feature-Box-Platine (Digital Scan) /


MEMORY
7445
TMS4C2970
MEMORY
7446
TMS4C2970
PROZONIC
7447
SAA4990
BENDIC
7450
SAA4970
uP
7505
87C654
PINS NC:7, 17, 20, 26, 27, 29, 30, 31, 32
7506
BC858C
PMBT2369
7504
2448 4u7
2445 100n
5445 5u6
+5V
+5A
2449 4u7
2446 100n
5446 5u6
+5B
5447 5u6
2447 100n
2455 4u7
2451 22n
5453
5454 5u6
2452 4u7
2453 100n
2454 2u2
2450 22n
3511 1k
4445
4446
3450 100
3452 100
3453 100
3451 100
3502 4K7
3503 220E
5505 5u6
2505 100n
3506 10K
3507 6K8
3504 27K
3505 2K2
F14
F15
F16
F18
F19
F20
Y1
Y2
Y3
Y4
Y5
Y6
Y7
Y8
Y9
Y10
Y11
Y12
Y13
D0
D1
D2
D3
D4
D5
D6
D7
D8
D9
D10
D11
SWCK
RSTW
WE
IE
SRCK
RSTR
RE
OE
RE1_OUT
CKL
UPCL
UPDA
RSTR
VRSYT
RE2_OUT
WE2_OUT
RE_IN
AP
SP
NC
HREF
VDD1
VDD2
VDD3
VDD4
VDD5
VDD6
VDD7
VDD8
VSS1
VSS2
VSS3
VSS4
VSS5
VSS6
VSS7
VSS8
YA7
YA6
YA5
YA4
YA3
YA2
YA1
YA0
UVA3
UVA2
UVA1
UVA0
UVB0
UVB1
UVB2
UVB3
YB0
YB1
YB2
YB3
YB4
YB5
YB6
YB7
YD7
YD6
YD5
YD4
YD3
YD2
YD1
YD0
UVD3
UVD2
UVD1
UVD0
UVC0
UVC1
UVC2
UVC3
YC0
YC1
YC2
YC3
YC4
YC5
YC6
YC7
YIN7
YIN6
YIN5
YIN4
YIN3
YIN2
YIN1
YIN0
UVIN3
UVIN2
UVIN1
UVIN0
TEST2
TEST1
VREFH
PREFHR
VDDAD
Vssa
Vssd
Vddd
Vdda-ref
CUR
Ya
Ua
Va
VSSD
XTAL
XTAL
CK2
IE
WE
CK1
CLMP
ALE
IT1
IT2
WRN
RDN
AD7
AD6
AD5
AD4
AD3
AD2
AD1
AD0
BONE
ALE
INT0
INT1
WR
RD
XTAL1
P2-1
RSTR
RSTW
RXD
TXD
VPP
VCC
VSS
P1-4
P2-4
13
14
15
16
17
18
19
20
21
22
23
24
25

Platine Boîtier Numérique (balayage numérique)


26
27
28
29
30
31
M1
+5R
+5V
3462
1K2
BC848C
7461
Vpor
7460
78L05
Out
In
Gnd
3460
22R
+13V
3461
6K8
2462
22µ
2464
22µ
2460
22µ
3467
47
2467
15p
3468
47
2468
33p
3466
120
5465
1u5
3515
0
5466
2u2
Y_FEAT
F48 1
3465
390
2465
39p
2510
res
2466
100p
3469
150E
2469
150p
F1
3476
220
5477
4u7
2477
4p7
U_FEAT
F48 2
3475
390
3477
20K
2476
33p
2478
120p
F2
F3
3481
270
5482
4u7
2482
4p7
V_FEAT
F48 3
F48 4
3480
390
3482
1K
2481
33p
2483
120p
52
56
55
2485
10p
2486
10p
1485
12MHz
3485
1M
F4
7490
PMBT2369
5490
V_d
F48 6
3490
4K7
3491
10K
2490
100pF
18
19
23
22
13
F5
7492
PMBT2369
5492
H_d
F48 5
3492
4K7
3493
10K
2492
56pF
+5V
3494
470
3495
47
2493
100pF
7493
BC858C
7500
BC848C
3500
560
BZX79-F8V2
6500
Vpor
F12
24
16
5
4
4506
4505
9
8
3508
100E
SDA
F49 9
3509
100E
SCL
F49 10
2508
47pF
2509
47pF
CHASSIS MD2
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q

1485	G26
2375	C 1
2376	C 2
2377	C 5
2378	C 5
2379	C 6
2380	C 7
2385	E 1
2386	E 2
2387	E 5
2388	E 6
2389	E 6
2390	E 8
2395	G 1
2396	G 2
2397	G 5
2398	F 6
2399	G 6
2400	G 8
2410	I 6
2411	H 7
2412	H 7
2413	H 7
2414	I 7
2415	I 7
2419	K 7
2420	K 7
2421	K 2
2422	K 2
2423	L 3
2424	L 2
2425	L 2
2426	L 2
2430	O 2
2433	P 2
2435	Q 2
2440	K12
2441	K12
2445	A15
2446	F15
2447	A20
2448	A15
2449	F15
2450	B23
2451	A24
2452	A24
2453	A25
2454	A25
2455	A24
2460	C28
2462	C27
2464	C27
2465	E27
2466	E29
2467	D28
2468	D30
2469	E30
2476	E27
2477	E28
2478	E29
2481	F27
2482	F28
2483	F29
2485	G27
2486	H27
2490	J30
2492	K30
2493	L29
2505	O22
2508	O30
2509	O30
2510	E28
3370	C 7
3371	E 7
3372	G 7
3375	C 2
3376	C 3
3377	C 4
3378	C 4
3379	C 6
3380	C 7
3385	E 2
3386	E 3
3387	E 4
3388	E 5
3389	E 5
3390	E 7
3395	G 2
3396	G 3
3397	G 4
3398	G 5
3399	G 5
3400	G 7
3410	I 5
3411	I 6
3413	H 6
3414	I 7
3422	K 3
3430	O 2
3431	O 2
3432	N 3
3433	P 2
3434	O 2
3435	Q 2
3436	Q 2
3450	I22
3451	J22
3452	I22
3453	J22
3460	C29
3461	C27
3462	B29
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3467	D28
3468	D29
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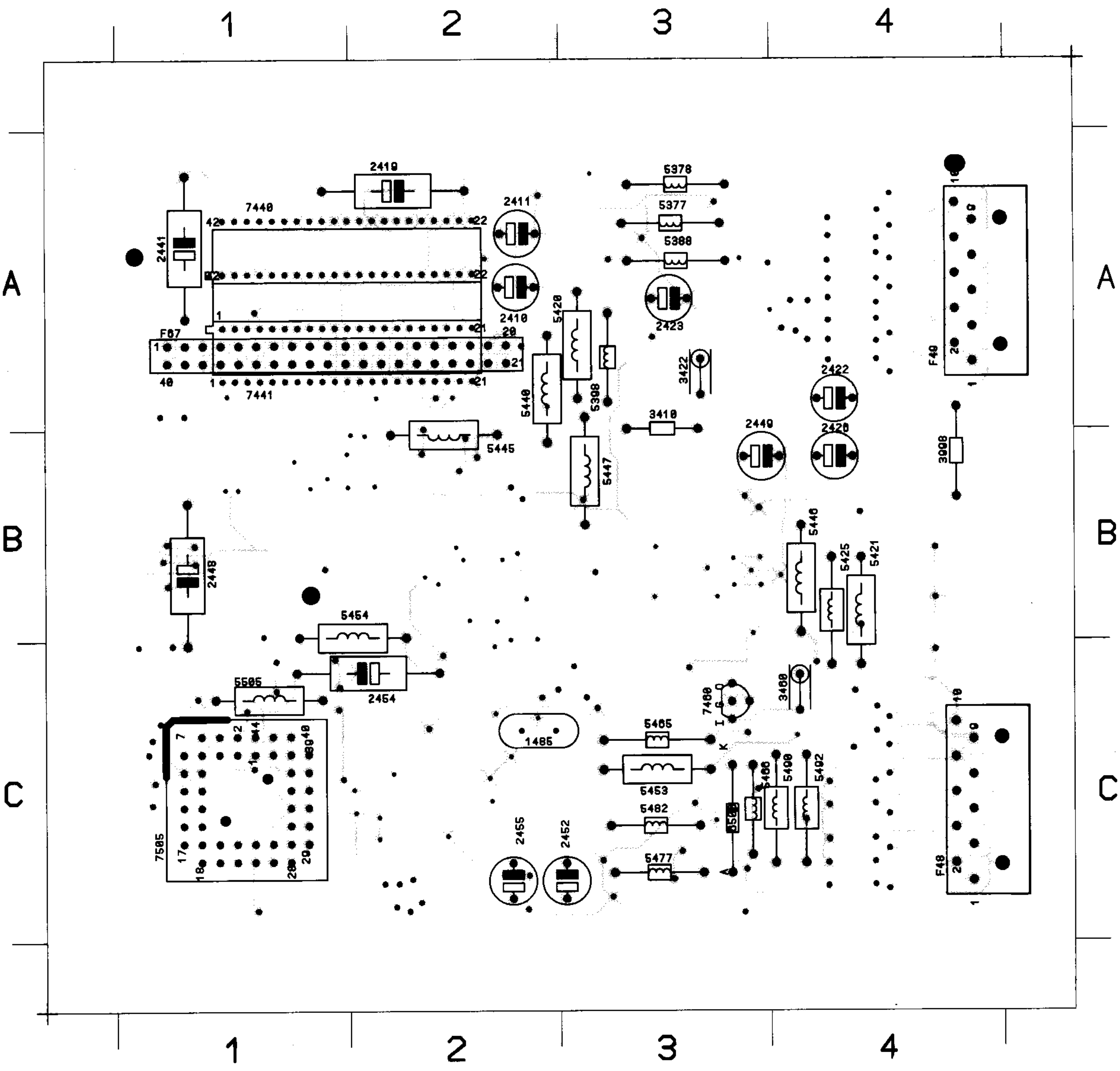
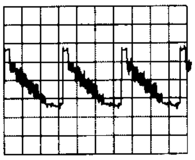
3477	E27
3480	F26
3481	F27
3482	F27
3485	G27
3490	I28
3491	J29
3492	J28
3493	K29
3494	L29
3495	L29
3500	L27
3502	M22
3503	M25
3504	P22
3505	Q22
3506	O21
3507	O21
3508	O29
3509	O29
3510	L 8
3511	E16
3512	C 3
3513	E 3
3514	G 3
3515	D29
3998	M 5
3999	N 5
4445	E13
4446	M13
4447	Q12
4505	N26
4506	N26
5377	C 5
5378	C 6
5388	E 6
5398	G 6
5420	J 7
5421	J 2
5425	L 2
5440	J12
5445	A16
5446	F16
5447	A18
5453	A25
5454	A25
5465	D28
5466	D29
5477	E28
5482	F28
5490	I29
5492	J30
5505	N22
6500	M27
6501	C 3
7376	C 3
7380	C 6
7386	E 3
7390	E 6
7396	F 3
7400	G 6
7432	N 2
7440	B 8
7441	B 9
7445	C15
7446	G15
7447	C18
7450	C23
7460	B27
7461	B28
7490	I29
7492	J29
7493	L29
7500	L26
7504	P22
7505	N23
7506	O21
F48	D31
F48	E31
F48	F31
F48	F31
F48	J31
F48	I31
F48	K 1
F48	L 1
F48	K 1
F49	O 1
F49	C 1
F49	E 1
F49	G 1
F49	D 1
F49	Q 1
F49	P 1
F49	O31
F49	O31
F67	B11

Feature Box (Digital Scan) panel /


1
2
3
4
A
B
C
2419
2411
7440
42
22
2441
2410
5420
2423
5378
5377
5388
F07
40
1
20
21
7441
5440
5398
3422
3410
2422
2449
2426
5445
5447
F49
3998
2448
5454
5446
5425
5421
2454
5505
3460
7460
1485
5465
5453
6500
5466
5490
5492
5482
5477
2455
2452
7505
F48

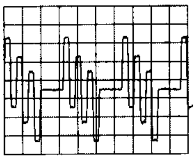
1485 C 2	2419 A 1	2426 B 4	2449 B 3	2455 C 2	3460 C 4	5378 A 3	5420 A 3	5440 B 2	5447 A 3	5465 C 3	5482 C 3	5505 C 1	7441 A 1	F48 C 4
2410 A 2	2422 A 4	2441 A 1	2452 C 3	3410 A 3	3998 B 4	5388 A 3	5421 C 4	5445 B 2	5453 C 3	5466 C 3	5490 C 4	6500 C 3	7460 C 3	F49 A 4
2411 A 2	2423 A 3	2448 B 1	2454 C 2	3422 A 3	5377 A 3	5398 A 3	5425 C 4	5446 B 4	5454 B 1	5477 C 3	5492 C 4	7440 A 1	7505 C 1	F07 A 1

F1



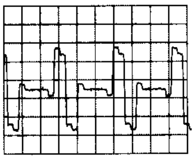
100mV/div
10µs/div

F2



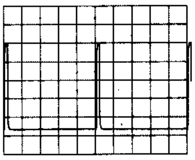
200mV/div
10µs/div

F3



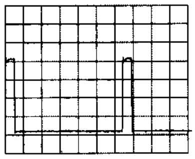
200mV/div
10µs/div

F4



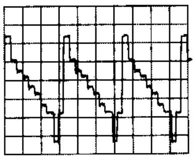
1V/div
2ms/div

F5



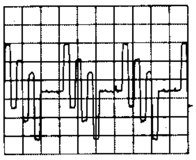
1V/div
5µs/div

F6



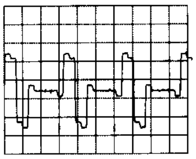
200mV/div
20µs/div

F7



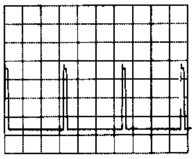
200mV/div
20µs/div

F8



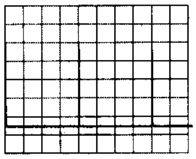
200mV/div
20µs/div

F9



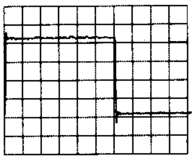
1V/div
20µs/div

F10



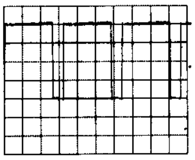
1V/div
5ms/div

F16



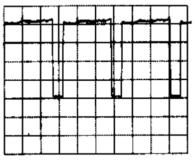
1V/div
0.5µs/div

F17



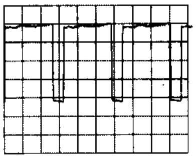
1V/div
20µs/div

F18



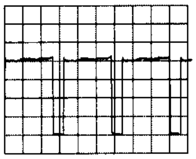
1V/div
10µs/div

F19



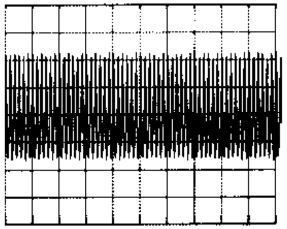
1V/div
10µs/div

F20



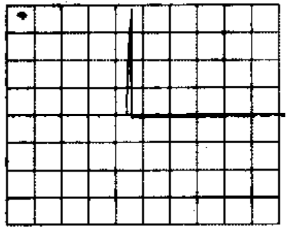
1V/div
10µs/div

F11



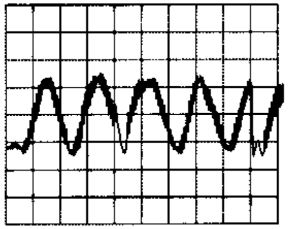
1V/div
0.5µs/div

F12



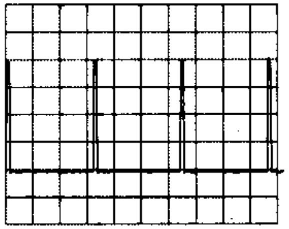
1V/div
50ms/div

F13



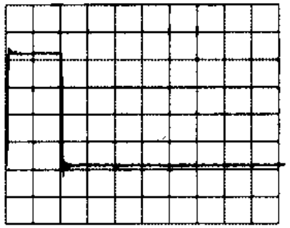
500V/div
50ns/div

F14



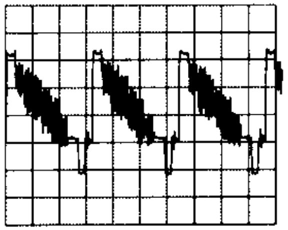
1V/div
20µs/div

F15



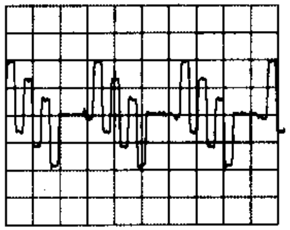
1V/div
0.5µs/div

F21



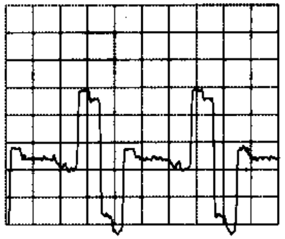
200mV/div
20µs/div

F22



200mV/div
20µs/div

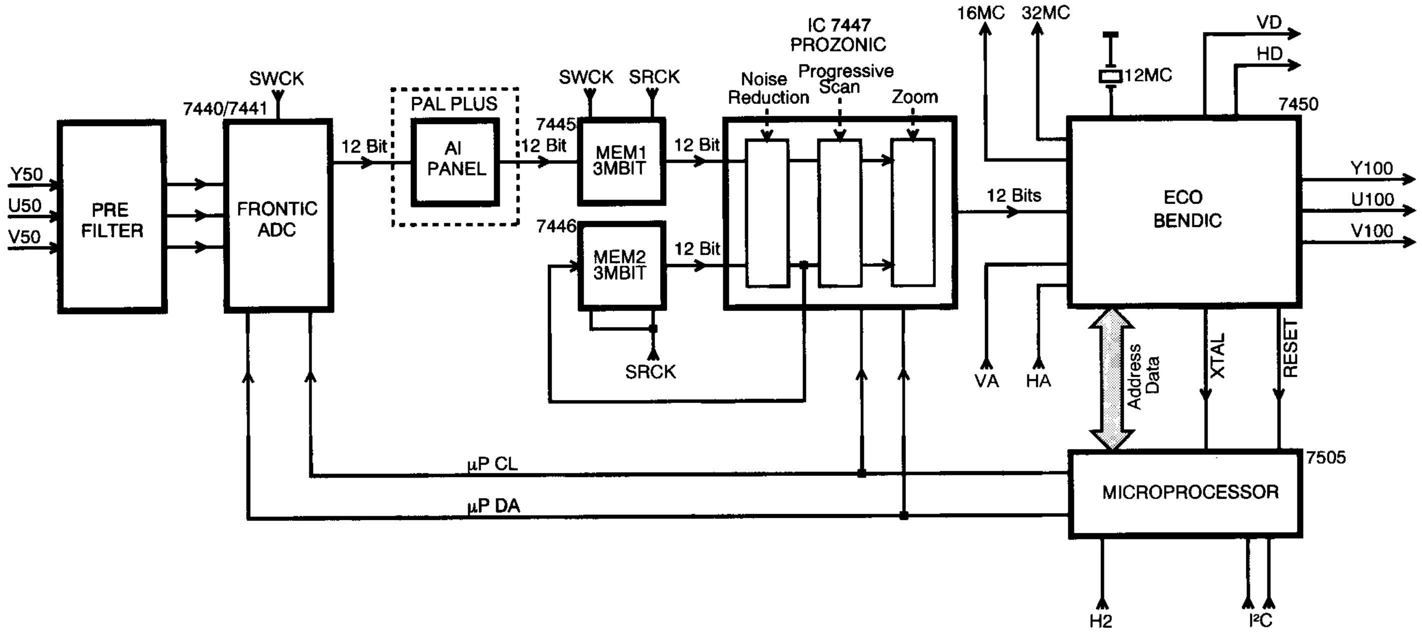
F23



200mV/div
20µs/div

PCS 91 167

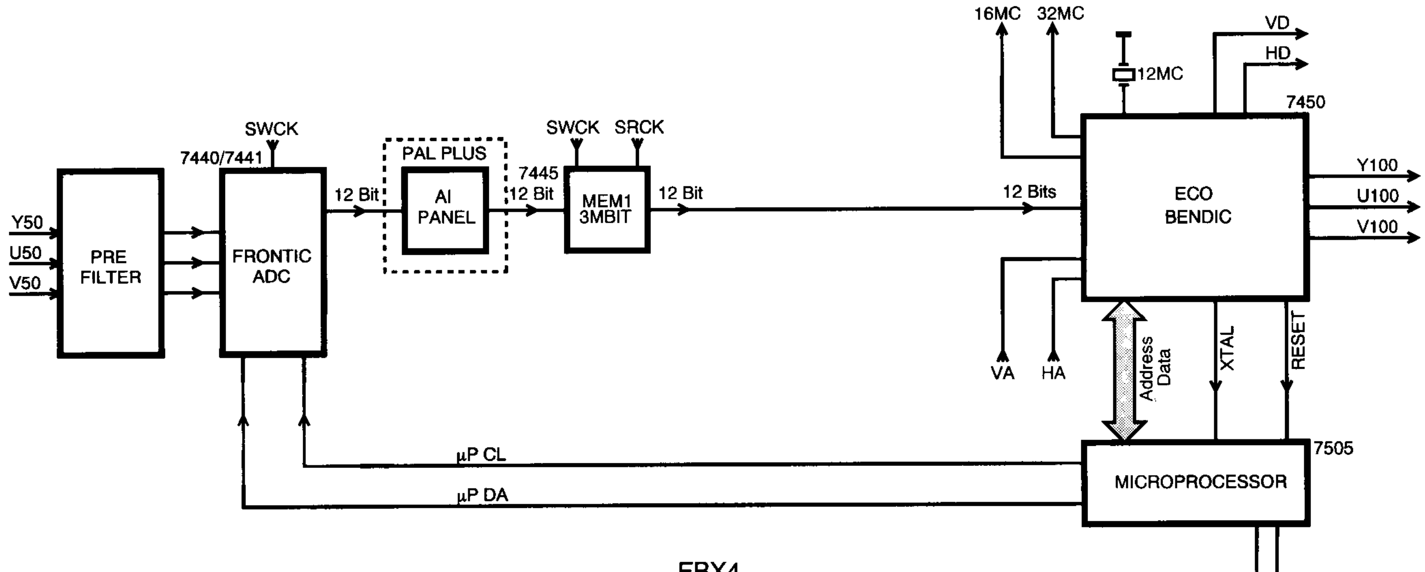
Feature box 3 (digital scan) M1


Y50
U50
V50
PRE FILTER
SWCK
7440/7441
FRONTIC ADC
12 Bit
PAL PLUS
AI PANEL
7445
12 Bit
SWCK
SRCK
MEM1 3MBIT
7446
MEM2 3MBIT
SRCK
12 Bit
12 Bit
IC 7447
PROZONIC
Noise Reduction
Progressive Scan
Zoom
16MC
32MC
12 Bits
12MC
VD
HD
7450
ECO BENDIC
Y100
U100
V100
VA
HA
Address Data
XTAL
RESET
µP CL
µP DA
7505
MICROPROCESSOR
H2
I²C

FBX3

66532024_016B.AI
080396

Feature box 4 (ECO) M2


Y50
U50
V50
PRE FILTER
SWCK
7440/7441
FRONTIC ADC
12 Bit
PAL PLUS
AI PANEL
7445
12 Bit
SWCK
SRCK
MEM1 3MBIT
12 Bit
12 Bits
16MC
32MC
12MC
VD
HD
7450
ECO BENDIC
Y100
U100
V100
VA
HA
Address Data
XTAL
RESET
µP CL
µP DA
7505
MICROPROCESSOR

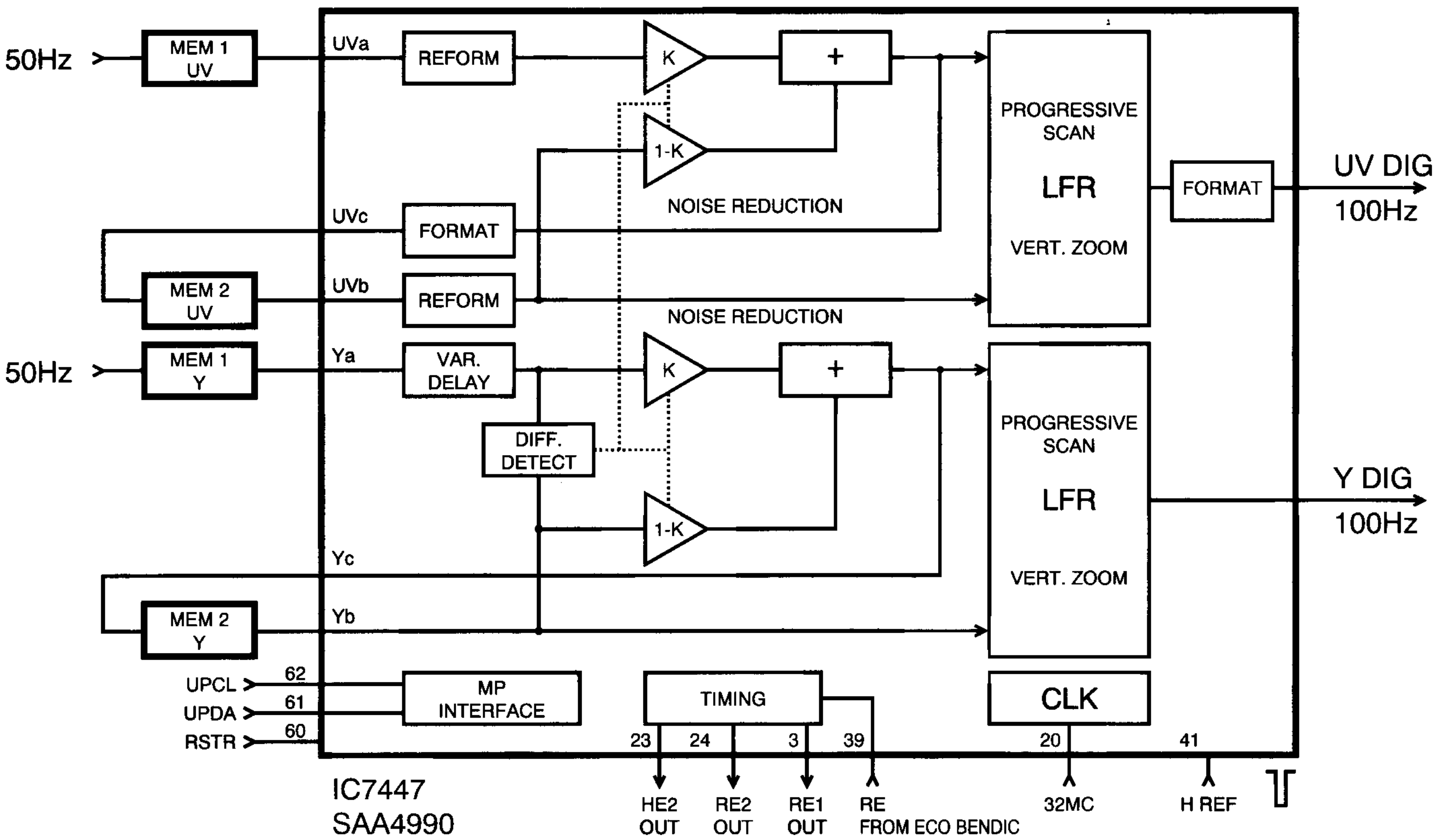
FBX4

I²C

76532013_006.AI
190297

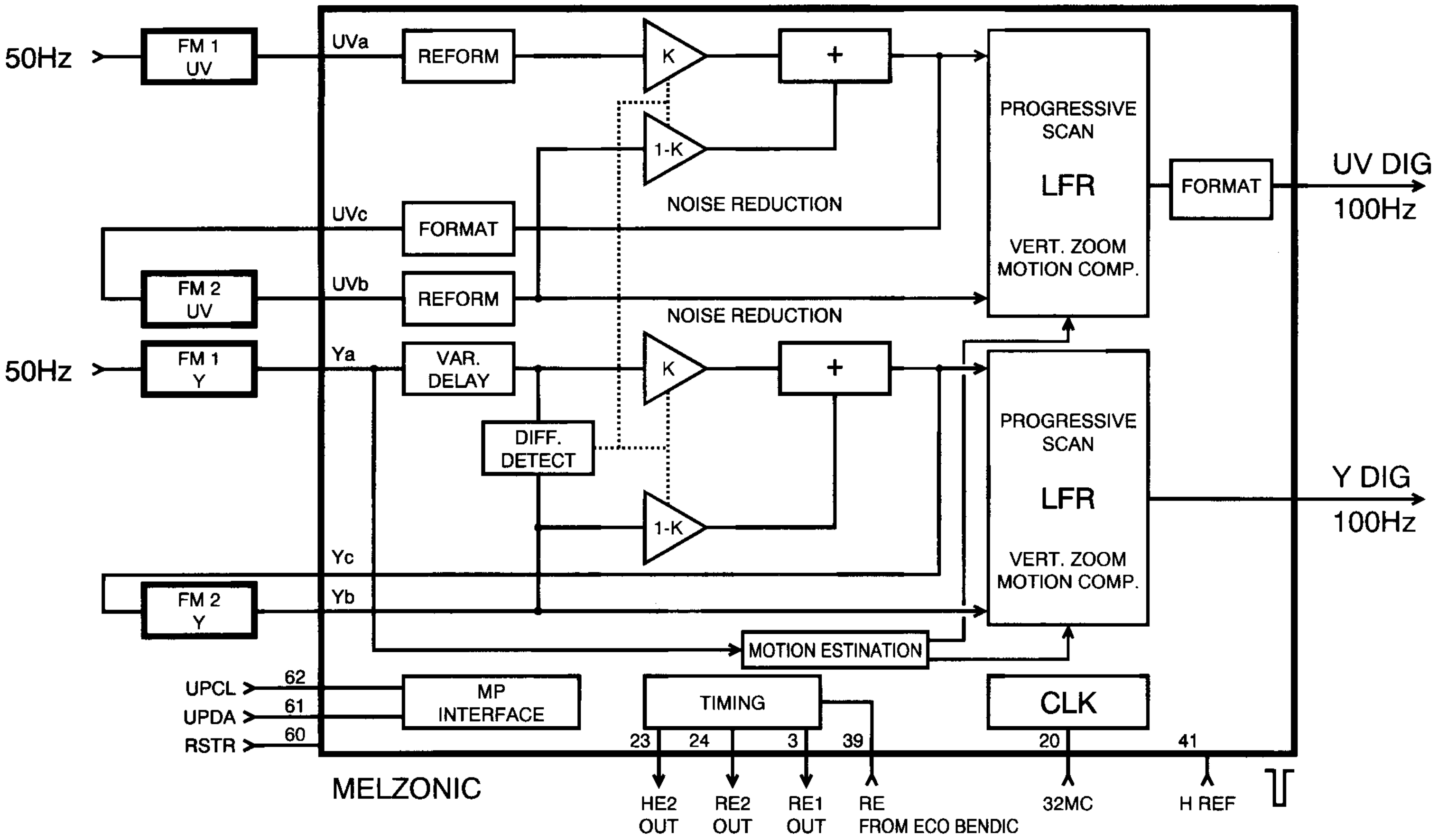
Schaltbilder der ICs in den Feature-Boxen /

Prozinic SAA 4990 (IC7447 Feature box digital scan) M1


50Hz
MEM 1 UV
UVa
REFORM
K
+
1-K
NOISE REDUCTION
UVc
FORMAT
MEM 2 UV
UVb
REFORM
NOISE REDUCTION
PROGRESSIVE SCAN
LFR
VERT. ZOOM
FORMAT
UV DIG
100Hz
50Hz
MEM 1 Y
Ya
VAR. DELAY
K
+
DIFF. DETECT
1-K
PROGRESSIVE SCAN
LFR
VERT. ZOOM
Y DIG
100Hz
Yc
MEM 2 Y
Yb
UPCL
UPDA
RSTR
62
61
60
MP INTERFACE
TIMING
CLK
23
24
3
39
20
41
IC7447
SAA4990
HE2 OUT
RE2 OUT
RE1 OUT
RE FROM ECO BENDIC
32MC
H REF

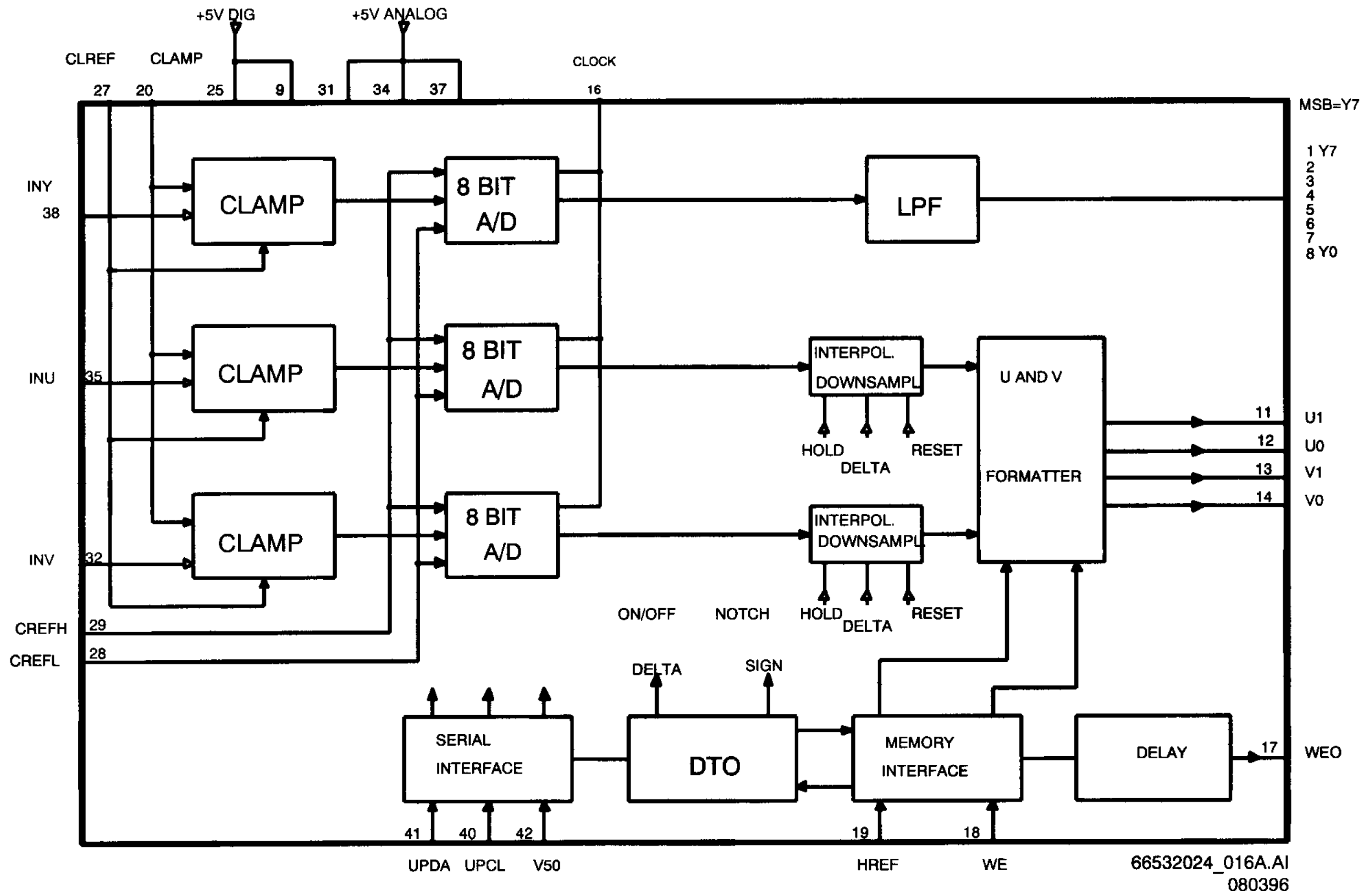
66532024_016H.AI
150396

MELZONIC SAA 4991 (IC 7447 Feature box natural motion) M1

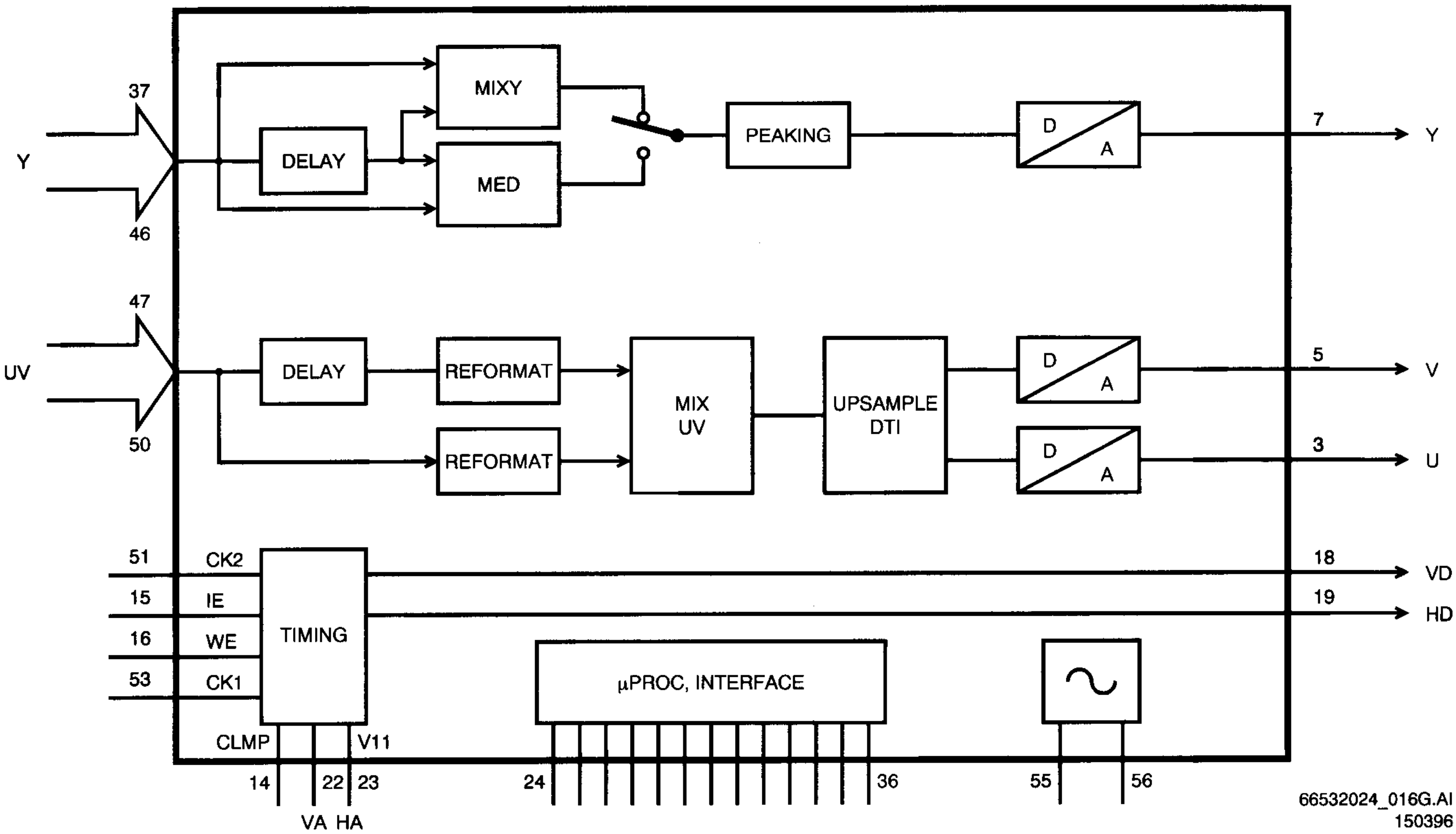

50Hz
FM 1 UV
UVa
REFORM
K
+
1-K
NOISE REDUCTION
UVc
FORMAT
FM 2 UV
UVb
REFORM
NOISE REDUCTION
PROGRESSIVE SCAN
LFR
VERT. ZOOM
MOTION COMP.
FORMAT
UV DIG
100Hz
50Hz
FM 1 Y
Ya
VAR. DELAY
K
+
DIFF. DETECT
1-K
PROGRESSIVE SCAN
LFR
VERT. ZOOM
MOTION COMP.
Y DIG
100Hz
Yc
FM 2 Y
Yb
MOTION ESTINATION
UPCL
UPDA
RSTR
62
61
60
MP INTERFACE
TIMING
CLK
23
24
3
39
20
41
MELZONIC
HE2 OUT
RE2 OUT
RE1 OUT
RE FROM ECO BENDIC
32MC
H REF

66532024_016J.AI
150396

FRONTIC TDA 8753 (IC 7440/7441 in both feature boxes) M1 / M2

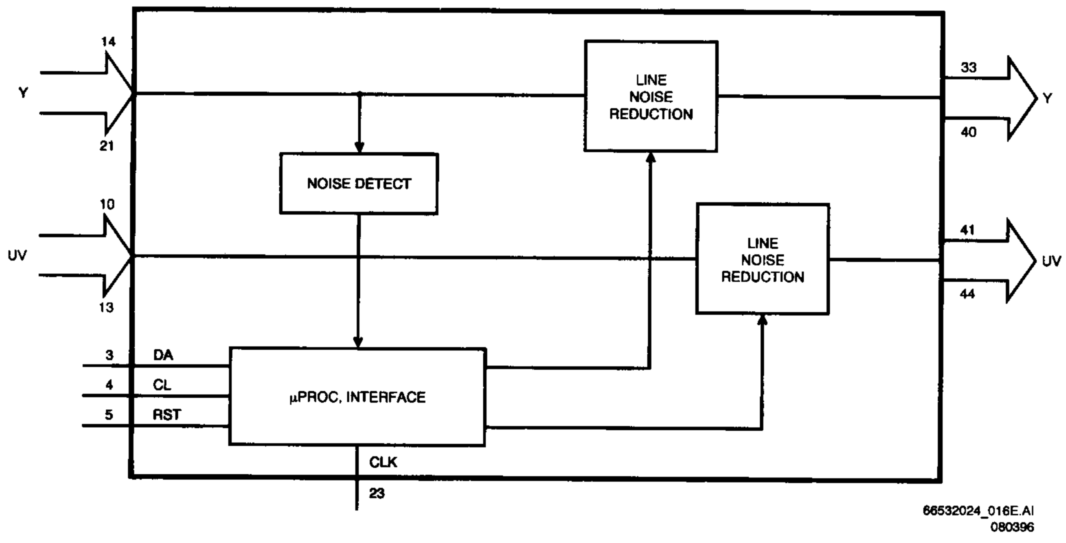

+5V DIG
+5V ANALOG
CLREF
CLAMP
CLOCK
27
20
25
9
31
34
37
16
MSB=Y7
1 Y7
2
3
4
5
6
7
8 Y0
INY
38
CLAMP
8 BIT A/D
LPF
INU
35
CLAMP
8 BIT A/D
INTERPOL. DOWNSAMPL
HOLD
DELTA
RESET
U AND V FORMATTER
11
U1
12
U0
13
V1
14
V0
INV
32
CLAMP
8 BIT A/D
INTERPOL. DOWNSAMPL
ON/OFF
NOTCH
HOLD
DELTA
RESET
CREFH
29
CREFL
28
DELTA
SIGN
SERIAL INTERFACE
DTO
MEMORY INTERFACE
DELAY
17
WEO
41
40
42
19
18
UPDA
UPCL
V50
HREF
WE
66532024_016A.AI
080396

BENDIC SAA 4970 (IC 7450 in both feature boxes) M1 / M2

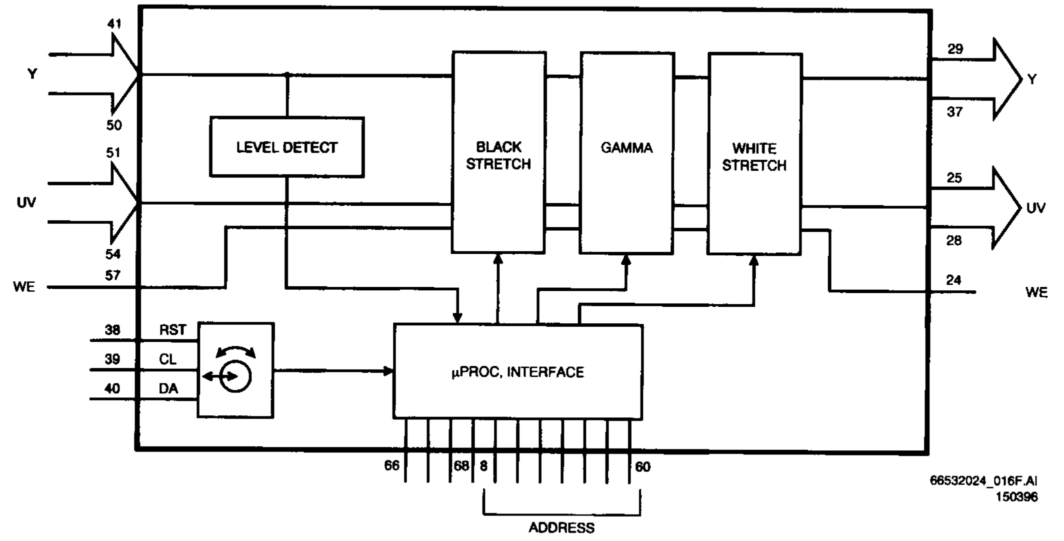

37
Y
46
MIXY
DELAY
MED
PEAKING
D
A
7
Y
47
UV
50
DELAY
REFORMAT
REFORMAT
MIX UV
UPSAMPLE DTI
D
A
5
V
D
A
3
U
51
CK2
15
IE
16
WE
53
CK1
TIMING
18
VD
19
HD
µPROC, INTERFACE
CLMP
V11
14
22
23
24
36
55
56
VA
HA
66532024_016G.AI
150396

dans les boîtes de fonctions

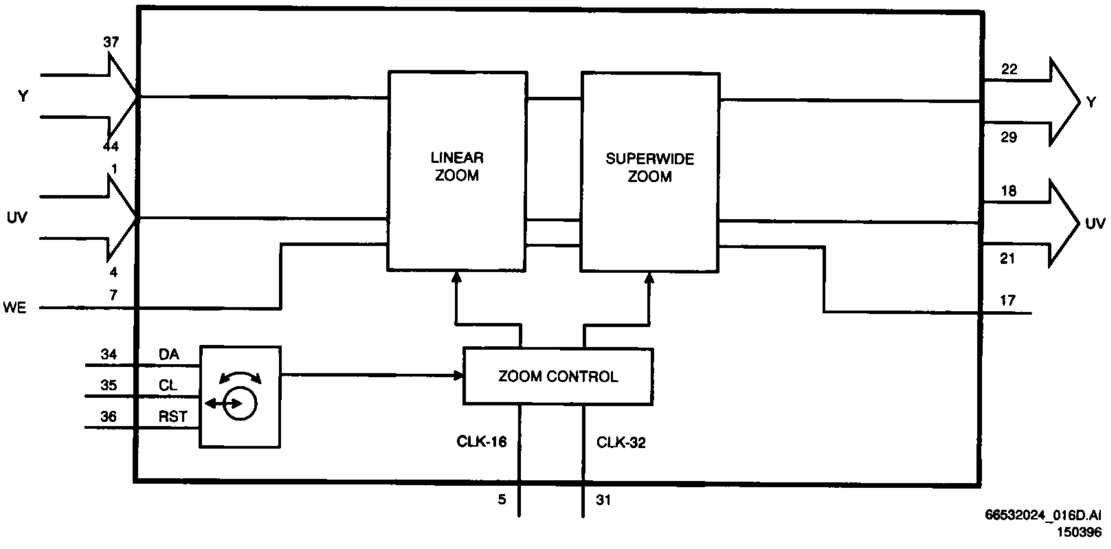
LIMERIC QFP44 (IC7005 on AI panel) N


14
Y
21
10
UV
13
3
DA
4
CL
5
RST
NOISE DETECT
LINE NOISE REDUCTION
LINE NOISE REDUCTION
µPROC. INTERFACE
CLK
23
33
Y
40
41
UV
44
66532024_016E.AI
080396

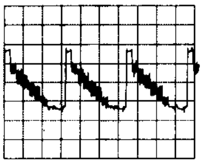
SMARTIC QFP80 (IC7008 on AI panel) N


41
Y
50
51
UV
54
57
WE
38
RST
39
CL
40
DA
LEVEL DETECT
BLACK STRETCH
GAMMA
WHITE STRETCH
µPROC. INTERFACE
66
68
8
60
ADDRESS
29
Y
37
25
UV
28
24
WE
66532024_016F.AI
150396

PANIC PLC44 (IC7010 on AI panel) N

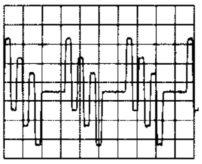

37
Y
44
1
UV
4
7
WE
34
DA
35
CL
36
RST
LINEAR ZOOM
SUPERWIDE ZOOM
ZOOM CONTROL
CLK-16
CLK-32
5
31
22
Y
29
18
UV
21
17
66532024_016D.AI
150396

F1



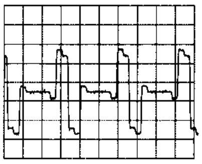
100mV/div
10µs/div

F2



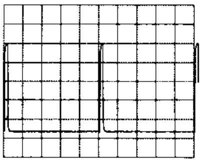
200mV/div
10µs/div

F3



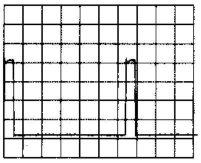
200mV/div
10µs/div

F4



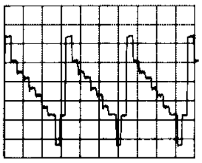
1V/div
2ms/div

F5



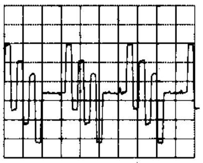
1V/div
5µs/div

F6



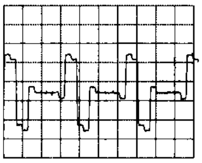
200mV/div
20µs/div

F7



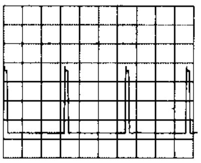
200mV/div
20µs/div

F8



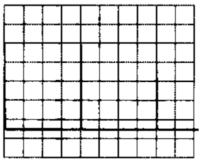
200mV/div
20µs/div

F9



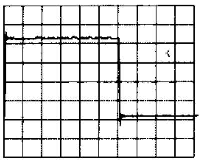
1V/div
20µs/div

F10



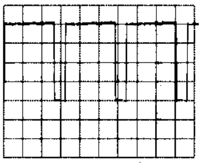
1V/div
5ms/div

F16



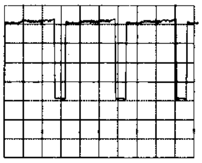
1V/div
0.5µs/div

F17



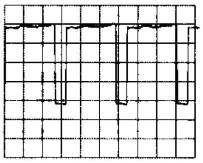
1V/div
20µs/div

F18



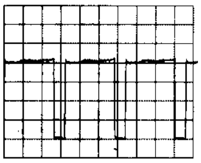
1V/div
10µs/div

F19



1V/div
10µs/div

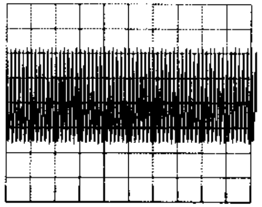
F20



1V/div
10µs/div

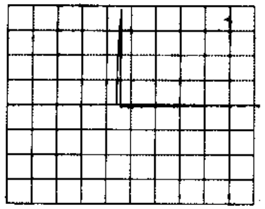
PCS 91 170

F11



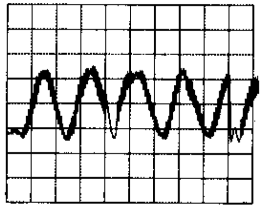
1V/div
0.5µs/div

F12



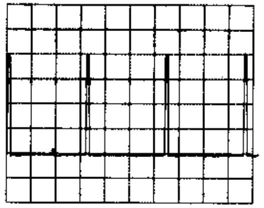
1V/div
50ms/div

F13



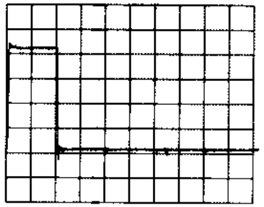
500V/div
50ns/div

F14



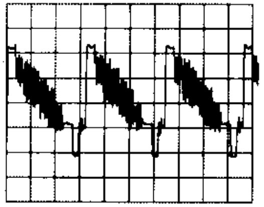
1V/div
20µs/div

F15



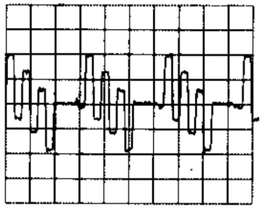
1V/div
0.5µs/div

F21



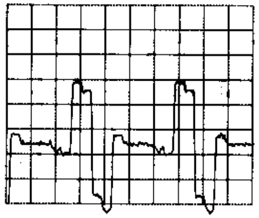
200mV/div
20µs/div

F22



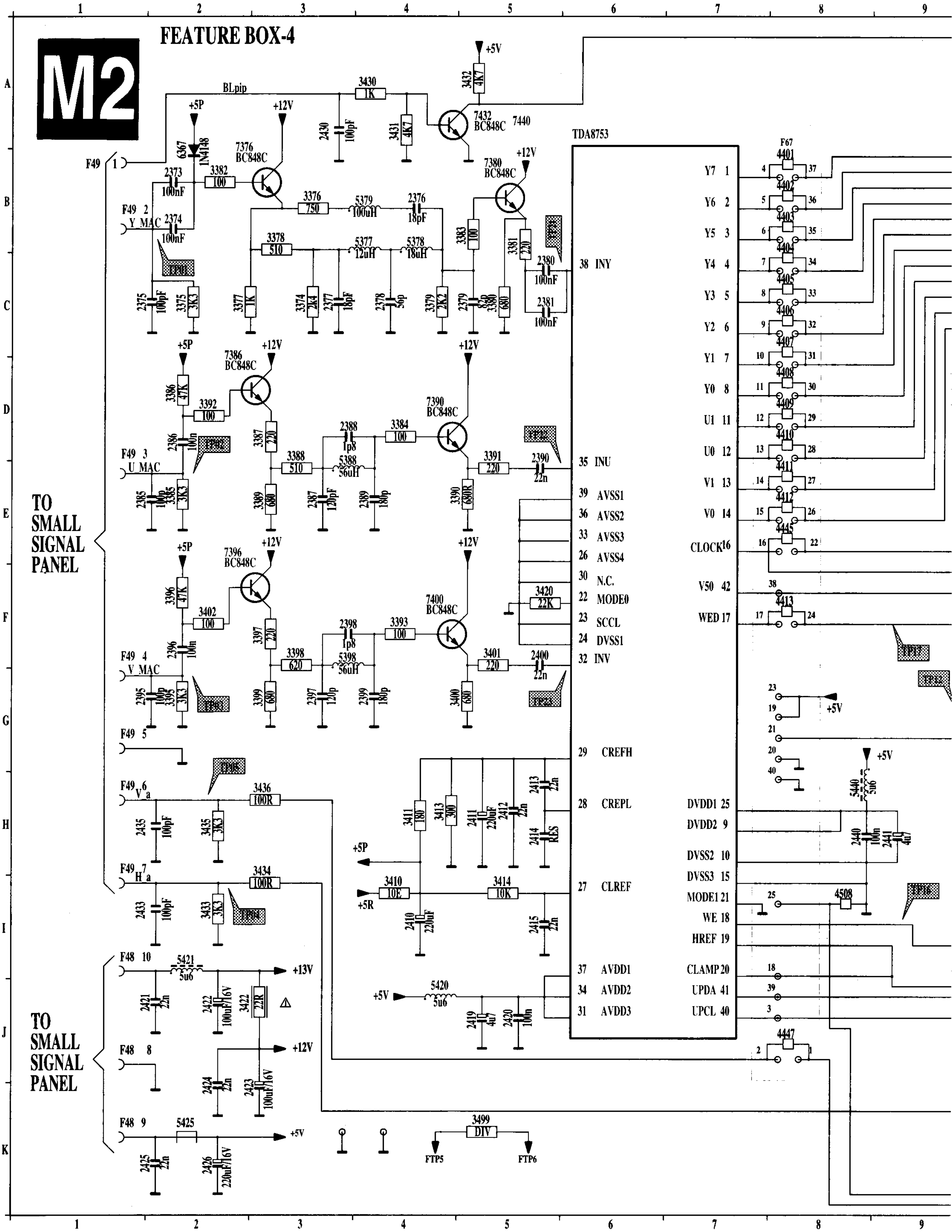
200mV/div
20µs/div

F23

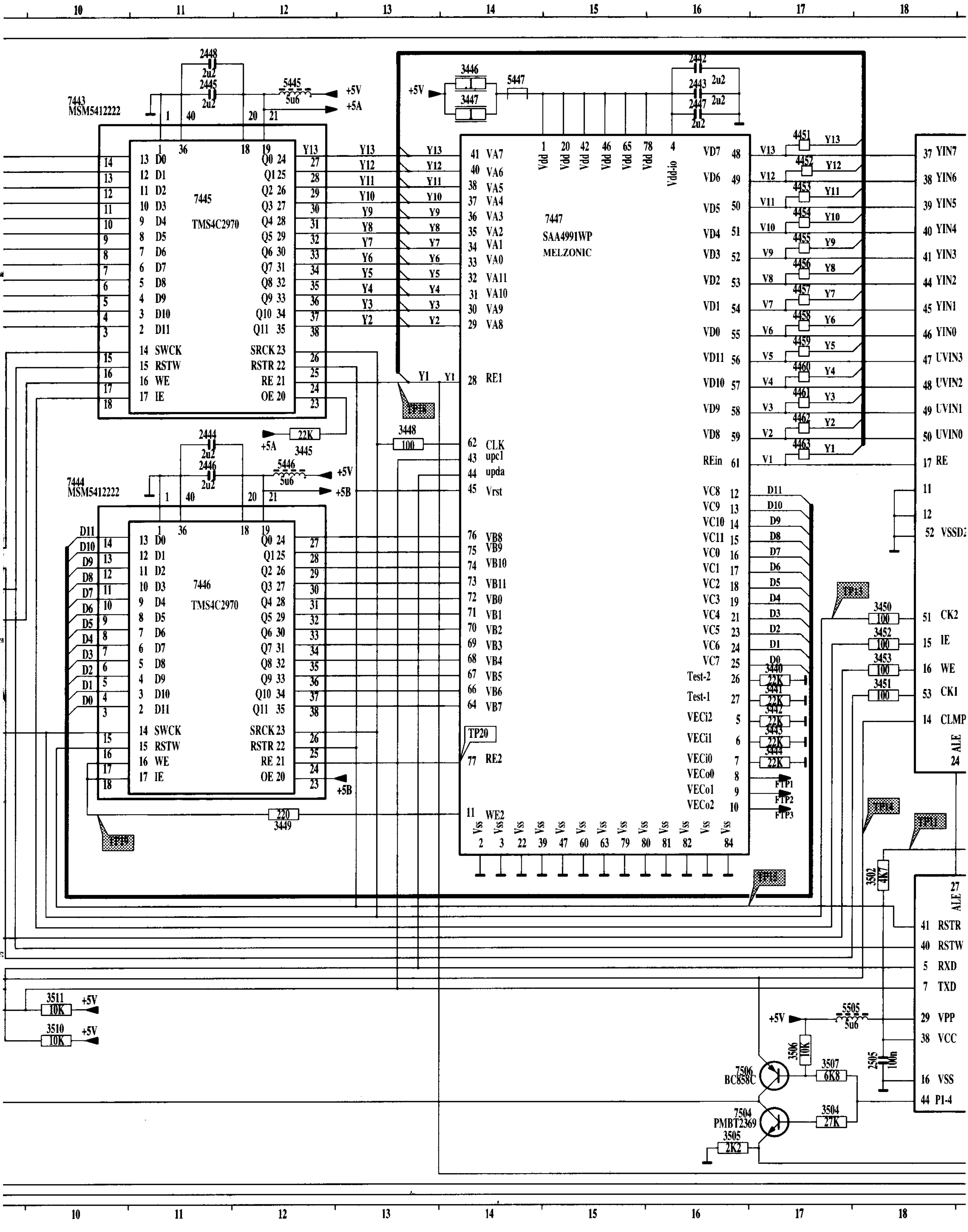


200mV/div
20µs/div

Feature Box (natural motion) panel /

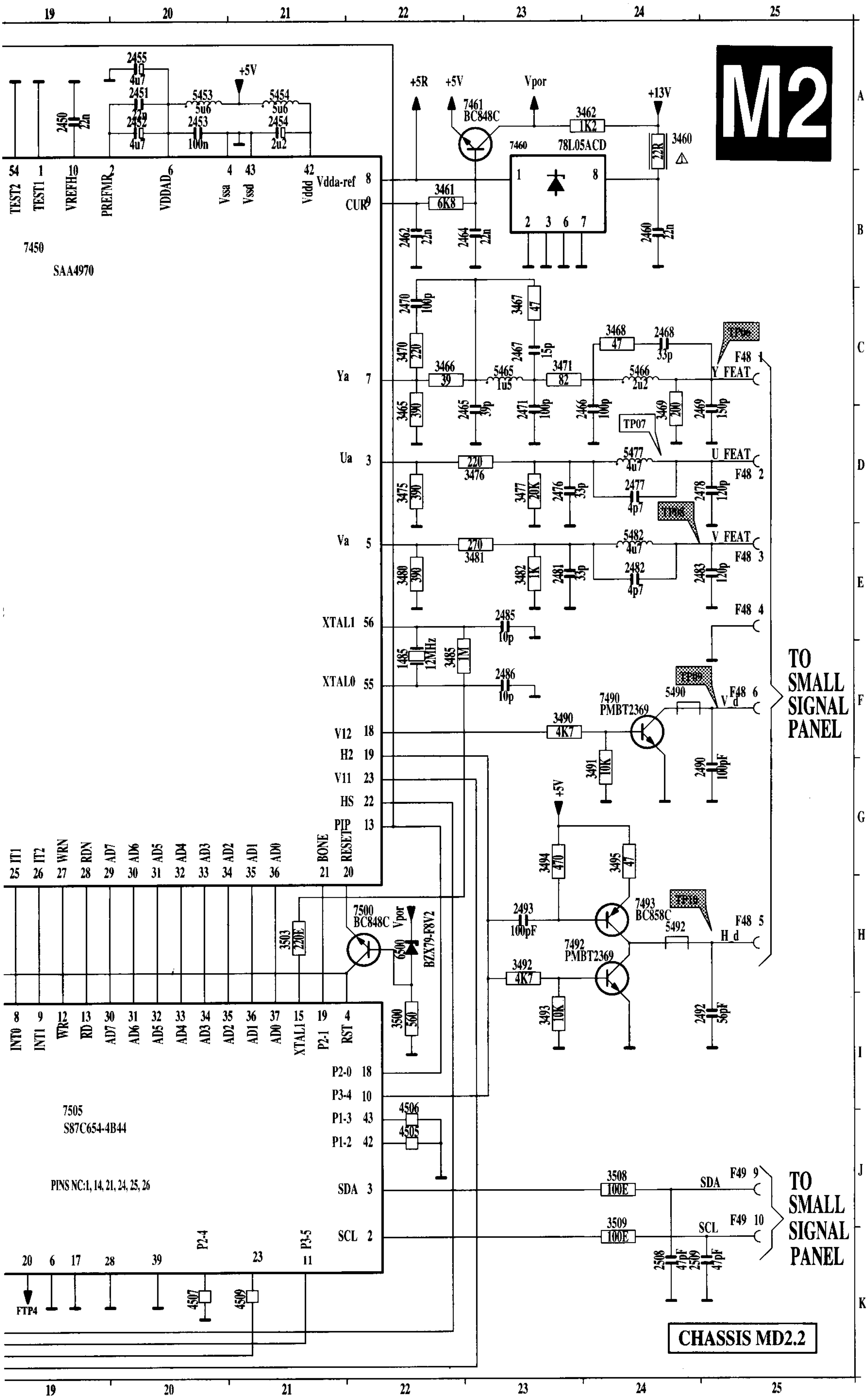

M2
FEATURE BOX-4
1 2 3 4 5 6 7 8 9
A B C D E F G H I J K
TO SMALL SIGNAL PANEL
TO SMALL SIGNAL PANEL
F49 1
BLpip
F49 2 Y_MAC
F49 3 U_MAC
F49 4 V_MAC
F49 5
F49 6 V_a
F49 7 H_a
F48 10
F48 8
F48 9
+5P
+12V
+5V
+13V
+5R
3430 1K
2430 100pF
3431 4K7
3432 4K7
7432 BC848C
7440
6367 1N4148
7376 BC848C
2373 100nF
3382 100
2374 100nF
3376 750
5379 100uH
2376 18pF
7380 BC848C
3378 510
5377 12uH
5378 18uH
3383 100
3381 220
2380 100nF
2381 100nF
2375 100pF
3375 3K3
3377 1K
3374 2k4
2377 18pF
2378 56p
3379 2K2
2379 82p
3380 680
TP01
TP11
7386 BC848C
3386 47K
3392 100
2386 100n
TP02
3387 220
2388 1p8
3384 100
7390 BC848C
3388 510
5388 56uH
3391 220
2390 22n
TP12
2385 100p
3385 3K3
3389 680
2387 120pF
2389 180p
3390 680R
7396 BC848C
3396 47K
3402 100
2396 100n
3397 220
2398 1p8
3393 100
7400 BC848C
3398 620
5398 56uH
3401 220
2400 22n
2395 100p
3395 3K3
TP03
3399 680
2397 120p
2399 180p
3400 680
TP23
TP05
3436 100R
2435 100pF
3435 3K3
3434 100R
2433 100pF
3433 3K3
TP04
3411 180
3413 300
2411 10 220uF
2412 22n
2413 22n
2414 RES
3410 10E
3414 10K
2410 220uF
2415 22n
3420 22K
5420 5u6
2419 10 4u7
2420 100n
5421 5u6
2421 22n
2422 100uF/16V
3422 22R
2424 22n
2423 100uF/16V
5425
2425 22n
2426 220uF/16V
3499 DIV
FTP5
FTP6
TDA8753
38 INY
35 INU
39 AVSS1
36 AVSS2
33 AVSS3
26 AVSS4
30 N.C.
22 MODE0
23 SCCL
24 DVSS1
32 INV
29 CREFH
28 CREPL
27 CLREF
37 AVDD1
34 AVDD2
31 AVDD3
Y7 1
Y6 2
Y5 3
Y4 4
Y3 5
Y2 6
Y1 7
Y0 8
U1 11
U0 12
V1 13
V0 14
CLOCK 16
V50 42
WED 17
DVDD1 25
DVDD2 9
DVSS2 10
DVSS3 15
MODE1 21
WE 18
HREF 19
CLAMP 20
UPDA 41
UPCL 40
F67
4401 4402 4403 4404 4405 4406 4407 4408 4409 4410 4411 4412 4445 4413
4 37 5 36 6 35 7 34 8 33 9 32 10 31 11 30 12 29 13 28 14 27 15 26 16 22 38 17 24
23 19 21 20 40
25 4508
18 39 3
4447 2 1
5440 5u6
2440 100n
2441 10 4u7
TP17
TP13
TP16

Feature-Box-Platine (Natürliche Bewegung) /



10
11
12
13
14
15
16
17
18
2448
2u2
2445
2u2
5445
5u6
+5V
+5A
7443
MSM5412222
7445
TMS4C2970
D0
D1
D2
D3
D4
D5
D6
D7
D8
D9
D10
D11
Q0
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
Q9
Q10
Q11
SWCK
RSTW
WE
IE
SRCK
RSTR
RE
OE
Y13
Y12
Y11
Y10
Y9
Y8
Y7
Y6
Y5
Y4
Y3
Y2
Y1
TP18
2444
2u2
2446
2u2
22K
3445
5446
5u6
+5B
7444
MSM5412222
7446
TMS4C2970
220
3449
TP19
3446
3447
5447
2442
2443
2u2
2447
2u2
7447
SAA4991WP
MELZONIC
VA0
VA1
VA2
VA3
VA4
VA5
VA6
VA7
VA8
VA9
VA10
VA11
RE1
CLK
upc1
upda
Vrst
VB0
VB1
VB2
VB3
VB4
VB5
VB6
VB7
VB8
VB9
VB10
VB11
TP20
RE2
WE2
Vdd
Vdd-io
Vss
3448
100
VD0
VD1
VD2
VD3
VD4
VD5
VD6
VD7
VD8
VD9
VD10
VD11
REin
VC0
VC1
VC2
VC3
VC4
VC5
VC6
VC7
VC8
VC9
VC10
VC11
Test-2
Test-1
VECi2
VECi1
VECi0
VECo0
VECo1
VECo2
3440
3441
3442
3443
3444
22K
FTP1
FTP2
FTP3
TP16
4451
4452
4453
4454
4455
4456
4457
4458
4459
4460
4461
4462
4463
V1
V2
V3
V4
V5
V6
V7
V8
V9
V10
V11
V12
V13
YIN7
YIN6
YIN5
YIN4
YIN3
YIN2
YIN1
YIN0
UVIN3
UVIN2
UVIN1
UVIN0
RE
VSSD
TP13
3450
3452
3453
3451
100
CK2
IE
WE
CK1
CLMP
ALE
TP14
TP11
3502
4K7
RSTR
RSTW
RXD
TXD
VPP
VCC
VSS
P1-4
3511
10K
3510
10K
+5V
5505
5u6
3506
10K
3507
6K8
2505
100n
7506
BC858C
7504
PMBT2369
3504
27K
3505
2K2

Platine Boîtier Numérique (mouvement natural)


M2
19
20
21
22
23
24
25
A
B
C
D
E
F
G
H
I
J
K
7450
SAA4970
TEST2 54
TEST1 1
VREFH 10
PREFMR 2
VDDAD 6
Vssa 4
Vssd 43
Vddd 42
Vdda-ref 8
CUR 9
Ya 7
Ua 3
Va 5
XTAL1 56
XTAL0 55
V12 18
H2 19
V11 23
HS 22
PIP 13
RESET 20
BONE 21
IT1 25
IT2 26
WRN 27
RDN 28
AD7 29
AD6 30
AD5 31
AD4 32
AD3 33
AD2 34
AD1 35
AD0 36
2455 4u7
2451 4u7
2452 4u7
2450 22n
5453 5u6
2453 100n
5454 5u6
2454 2u2
+5V
+5R
+5V
7461 BC848C
Vpor
3462 1K2
+13V
7460 78L05ACD
3460 22R
3461 6K8
2462 22n
2464 22n
2460 22n
2470 100p
3467 47
3470 220
3468 47
2468 33p
TP06
3466 39
5465 1u5
2467 15p
3471 82
5466 2u2
Y FEAT
F48 1
3465 390
2465 39p
2471 100p
2466 100p
TP07
3469 200
2469 150p
220 3476
5477 4u7
U FEAT
F48 2
3475 390
3477 20K
2476 33p
2477 4p7
2478 120p
TP08
270 3481
5482 4u7
V FEAT
F48 3
3480 390
3482 1K
2481 33p
2482 4p7
2483 120p
F48 4
2485 10p
1485 12MHz
3485 1M
2486 10p
TP09
5490
V d
F48 6
7490 PMBT2369
3490 4K7
3491 10K
2490 100pF
TO SMALL SIGNAL PANEL
+5V
3494 470
3495 47
TP10
7493 BC858C
2493 100pF
5492
H d
F48 5
7492 PMBT2369
3492 4K7
3493 10K
2492 56pF
7500 BC848C
Vpor
6500 BZX79-F8V2
3503 220E
3500 560
INT0 8
INT1 9
WR 12
RD 13
AD7 30
AD6 31
AD5 32
AD4 33
AD3 34
AD2 35
AD1 36
AD0 37
XTAL1 15
P2-1 19
RST 4
P2-0 18
P3-4 10
P1-3 43
P1-2 42
4506
4505
SDA 3
SCL 2
7505
S87C654-4B44
PINS NC:1, 14, 21, 24, 25, 26
3508 100E
3509 100E
SDA
SCL
F49 9
F49 10
2508 47pF
2509 47pF
TO SMALL SIGNAL PANEL
20
6
17
28
39
P2-4
23
P3-5 11
FTP4
4507
4509
CHASSIS MD2.2

1485	F22
2373	B 2
2374	B 2
2375	C 1
2376	B 4
2377	C 3
2378	C 4
2379	C 5
2380	C 5
2381	C 5
2385	E 1
2386	D 2
2387	E 3
2388	D 3
2389	E 4
2390	E 5
2395	G 1
2396	F 2
2397	G 3
2398	F 3
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2414	H 5
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2420	J 5
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2425	K 2
2426	K 2
2430	A 3
2433	I 1
2435	H 1
2440	H 8
2441	H 9
2442	A16
2443	A16
2444	D11
2445	A11
2446	E11
2447	A16
2448	A11
2450	A19
2451	A20
2452	A20
2453	A20
2454	A21
2455	A20
2460	B24
2462	B22
2464	B23
2465	D23
2466	D24
2467	C23
2468	C24
2469	D25
2470	C22
2471	D23
2476	D23
2477	D24
2478	D25
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3381	B 5
3382	B 2
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3384	D 4
3385	E 2
3386	D 2
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3388	D 3
3389	E 3
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3391	D 5
3392	D 2
3393	F 4
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3398	F 3
3399	G 3
3400	G 5
3401	F 5
3402	F 2
3410	I 4
3411	H 4
3413	H 4
3414	I 5
3420	F 5
3422	J 2
3430	A 4
3431	A 4
3432	A 5
3433	I 2
3434	H 3
3435	H 2
3436	H 3
3440	G17
3441	G17
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3447	A14
3448	D13
3449	H12
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3451	G18
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3453	F18
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3469	D24
3470	C22
3471	C23
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3476	D23
3477	D23
3480	E22
3481	E23
3482	E23
3485	F22
3490	F23
3491	G24
3492	H23
3493	I23
3494	G23
3495	G24
3499	K 5
3500	I22
3502	I18
3503	H21
3504	K17
3505	K16
3506	J17
3507	J17
3508	J24
3509	J24
3510	J10
3511	J10
4401	B 8
4402	B 8
4403	B 8
4404	B 8
4405	C 8
4406	C 8
4407	C 8
4408	D 8
4409	D 8
4410	D 8
4411	E 8
4412	E 8
4413	F 8
4445	E 8
4447	J 8
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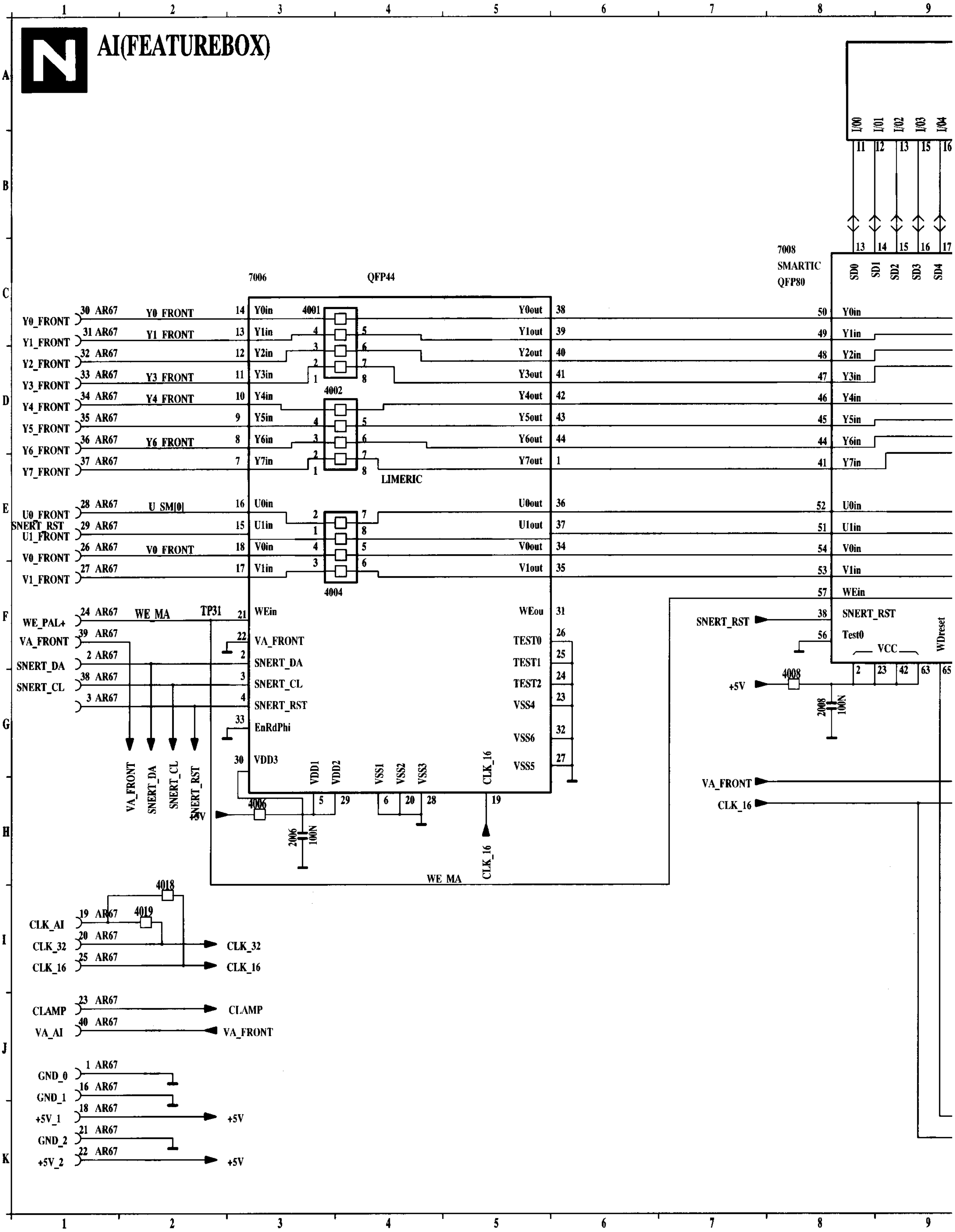
4452	B17
4453	B17
4454	B17
4455	B17
4456	C17
4457	C17
4458	C17
4459	C17
4460	D17
4461	D17
4462	D17
4463	D17
4505	J22
4506	J22
4507	K20
4508	I 8
4509	K21
5377	B 4
5378	B 4
5379	B 4
5388	E 3
5398	F 3
5420	J 4
5421	I 2
5425	K 2
5440	H 8
5445	A12
5446	E12
5447	A14
5453	A20
5454	A21
5465	C23
5466	C24
5477	D24
5482	E24
5490	F24
5492	H24
5505	J18
6367	A 2
6500	H22
7376	B 2
7380	B 5
7386	D 2
7390	D 4
7396	E 2
7400	F 4
7432	A 5
7440	A 5
7443	A10
7444	E10
7445	B11
7446	F11
7447	B15
7450	B19
7460	A23
7461	A22
7490	F24
7492	H23
7493	H24
7500	H22
7504	K17
7505	J19
7506	K17
F48	C25
F48	D25
F48	E25
F48	E25
F48	H25
F48	F25
F48	J 1
F48	K 1
F48	I 1
F49	A 1
F49	B 1
F49	D 1
F49	F 1
F49	G 1
F49	H 1
F49	H 1
F49	J25
F49	J25
F67	A 8

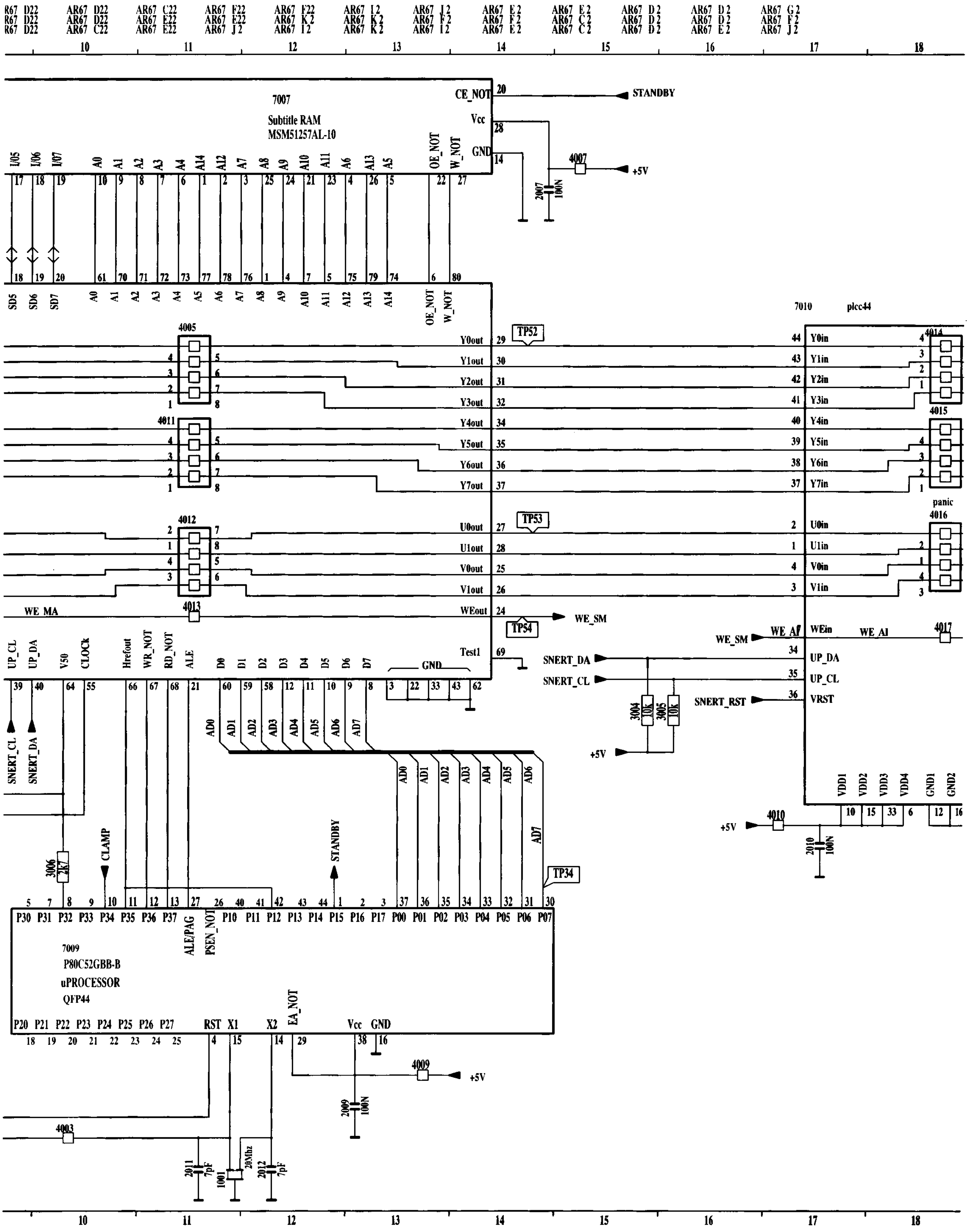
AI (Artificial Intelligence) panel /

1001	K11	2008	G 8	2011	K11	3005	G16	4002	D 3	4005	C11	4008	G 8	4011	D11	4014	C18	4017	F18	7006	C 3	7009	I10	AR67	F 2	A
2006	H 3	2009	K13	2012	K12	3006	H10	4003	K10	4006	H 3	4009	J13	4012	E11	4015	D18	4018	I 2	7007	A12	7010	C17	AR67	G 2	A
2007	B14	2010	H17	3004	G15	4001	C 3	4004	F 3	4007	A15	4010	H17	4013	F11	4016	E18	4019	I 2	7008	C 8	AR67	J 2	AR67	E22	A

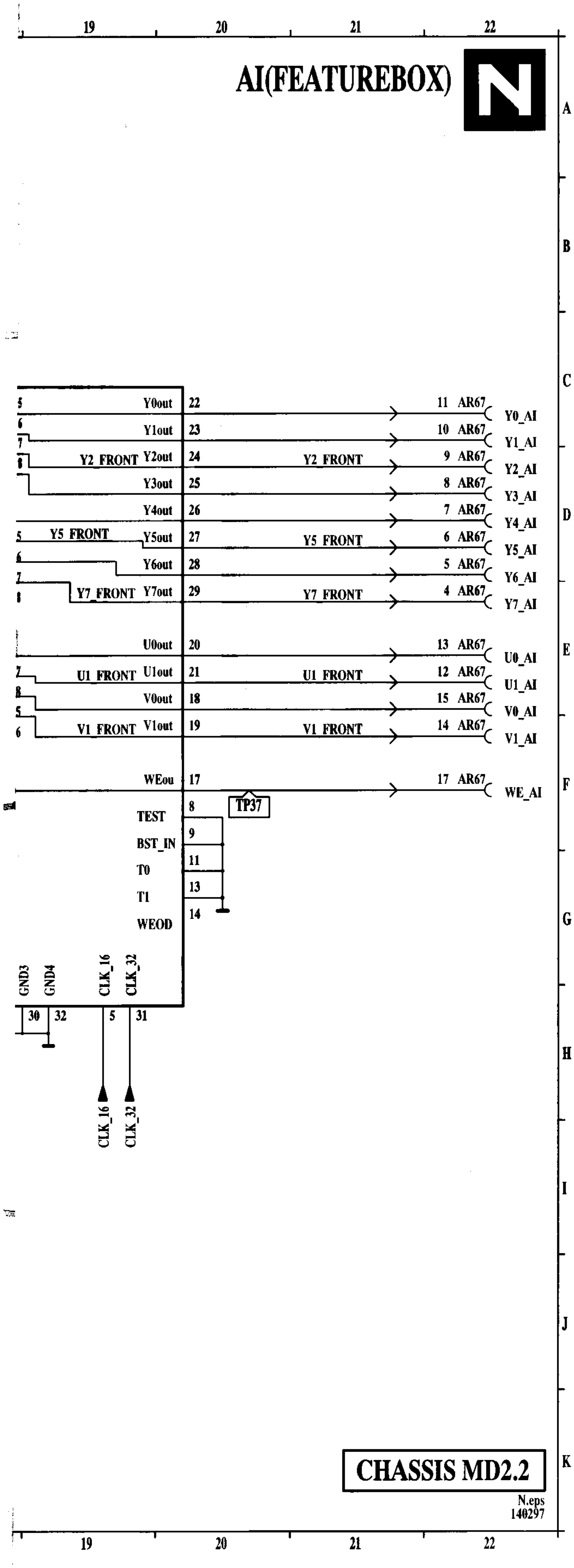


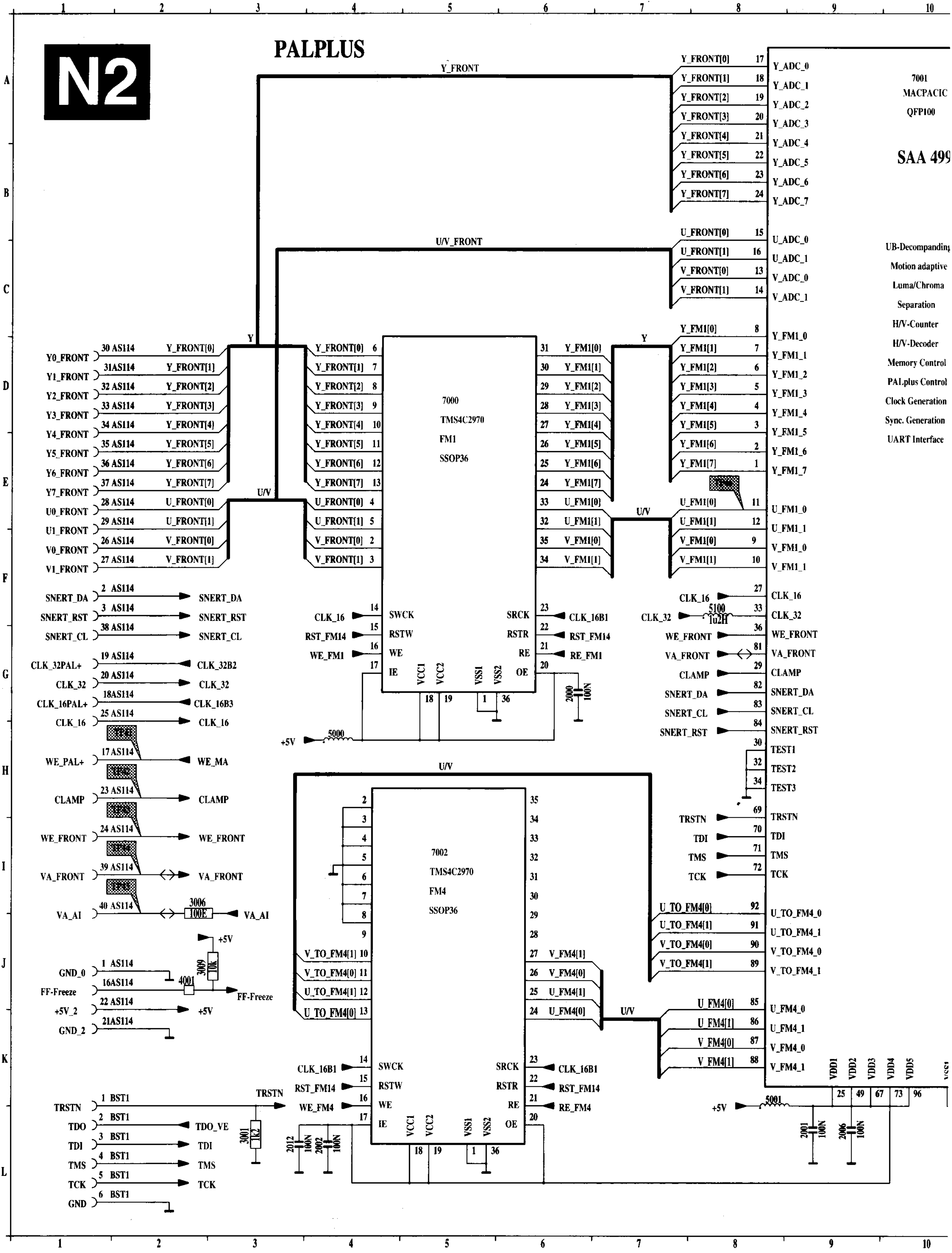
N
AI(FEATUREBOX)
7006
QFP44
LIMERIC
4001
4002
4004
7008
SMARTIC
QFP80
Y0_FRONT
Y1_FRONT
Y2_FRONT
Y3_FRONT
Y4_FRONT
Y5_FRONT
Y6_FRONT
Y7_FRONT
U0_FRONT
SNERT_RST
U1_FRONT
V0_FRONT
V1_FRONT
WE_PAL+
VA_FRONT
SNERT_DA
SNERT_CL
WE_MA
TP31
U_SM[0]
Y0in
Y1in
Y2in
Y3in
Y4in
Y5in
Y6in
Y7in
U0in
U1in
V0in
V1in
WEin
EnRdPhi
VDD3
VDD1
VDD2
VSS1
VSS2
VSS3
CLK_16
Y0out
Y1out
Y2out
Y3out
Y4out
Y5out
Y6out
Y7out
U0out
U1out
V0out
V1out
WEou
TEST0
TEST1
TEST2
VSS4
VSS6
VSS5
4006
2006
100N
+5V
4008
2008
100N
Test0
VCC
WDreset
I/00
I/01
I/02
I/03
I/04
SD0
SD1
SD2
SD3
SD4
4018
4019
CLK_AI
CLK_32
CLK_16
CLAMP
VA_AI
GND_0
GND_1
+5V_1
GND_2
+5V_2
AR67

AI-(Künstliche Intelligenz)-Platine /

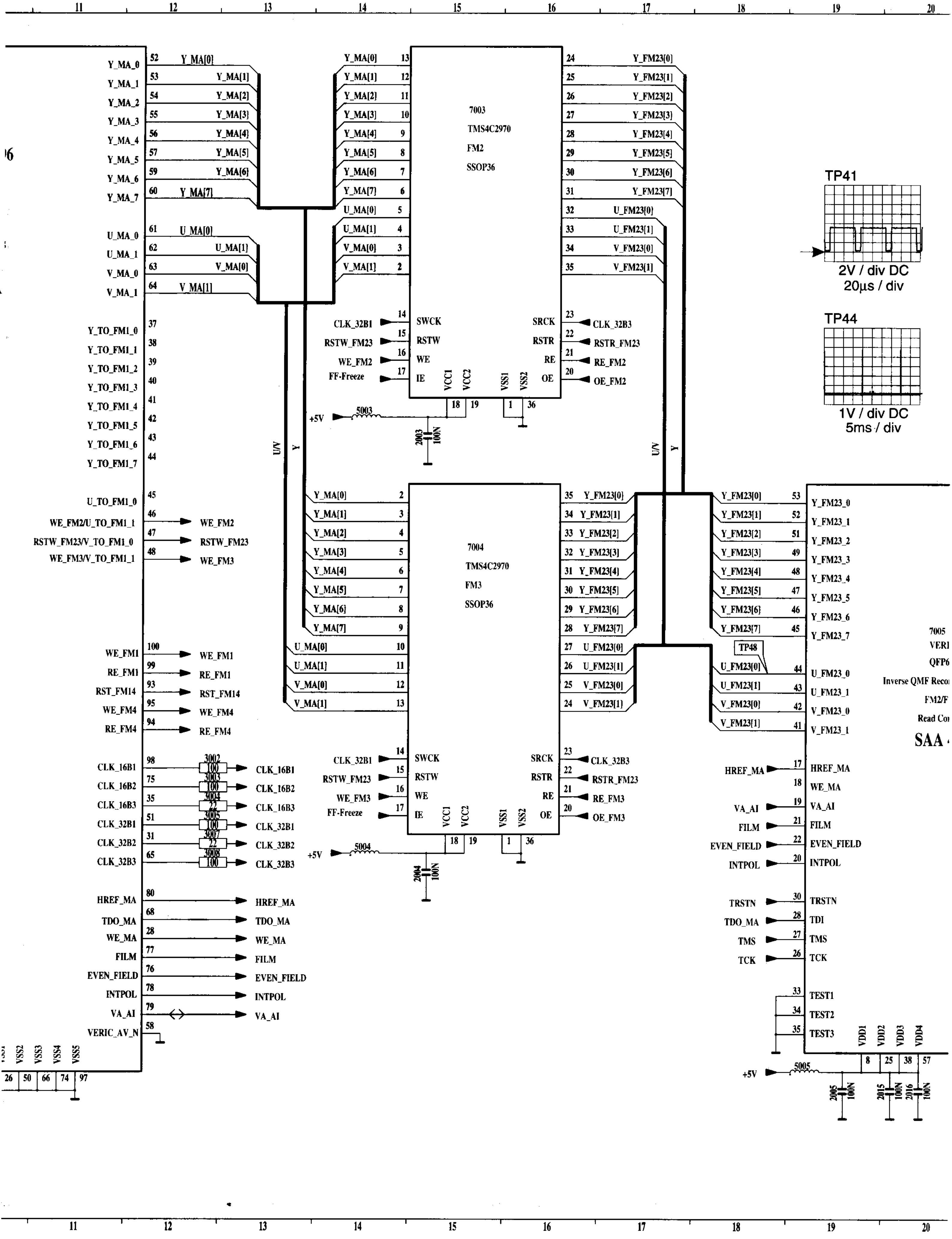

7007
Subtitle RAM
MSM51257AL-10
CE_NOT
Vcc
GND
OE_NOT
W_NOT
STANDBY
4007
+5V
2007
100N
4005
4011
4012
4013
WE_MA
Y0out
Y1out
Y2out
Y3out
Y4out
Y5out
Y6out
Y7out
U0out
U1out
V0out
V1out
WEout
Test1
GND
TP52
TP53
TP54
TP34
WE_SM
7010
plcc44
Y0in
Y1in
Y2in
Y3in
Y4in
Y5in
Y6in
Y7in
U0in
U1in
V0in
V1in
WEin
WE_AI
UP_DA
UP_CL
VRST
4014
4015
panic
4016
4017
SNERT_DA
SNERT_CL
SNERT_RST
3004
10k
3005
10k
VDD1
VDD2
VDD3
VDD4
GND1
GND2
4010
2010
100N
UP_CL
UP_DA
V50
CLOCK
Hrefout
WR_NOT
RD_NOT
ALE
CLAMP
3006
2K7
7009
P80C52GBB-B
uPROCESSOR
QFP44
ALE/PAG
PSEN_NOT
EA_NOT
RST
X1
X2
Vcc
GND
4009
2009
100N
4003
2011
7pF
1001
20Mhz
2012
7pF

Platine AI (Intelligence Artificielle)


19
20
21
22
A
B
C
D
E
F
G
H
I
J
K
AI(FEATUREBOX)
N
Y0out
Y1out
Y2 FRONT
Y2out
Y3out
Y4out
Y5 FRONT
Y5out
Y6out
Y7 FRONT
Y7out
U0out
U1 FRONT
U1out
V0out
V1 FRONT
V1out
WEou
TEST
BST_IN
T0
T1
WEOD
GND3
GND4
CLK_16
CLK_32
30
32
5
31
22
23
24
25
26
27
28
29
20
21
18
19
17
8
9
11
13
14
TP37
Y2 FRONT
Y5 FRONT
Y7 FRONT
U1 FRONT
V1 FRONT
11 AR67
10 AR67
9 AR67
8 AR67
7 AR67
6 AR67
5 AR67
4 AR67
13 AR67
12 AR67
15 AR67
14 AR67
17 AR67
Y0_AI
Y1_AI
Y2_AI
Y3_AI
Y4_AI
Y5_AI
Y6_AI
Y7_AI
U0_AI
U1_AI
V0_AI
V1_AI
WE_AI
CLK_16
CLK_32
CHASSIS MD2.2
N.eps
140297

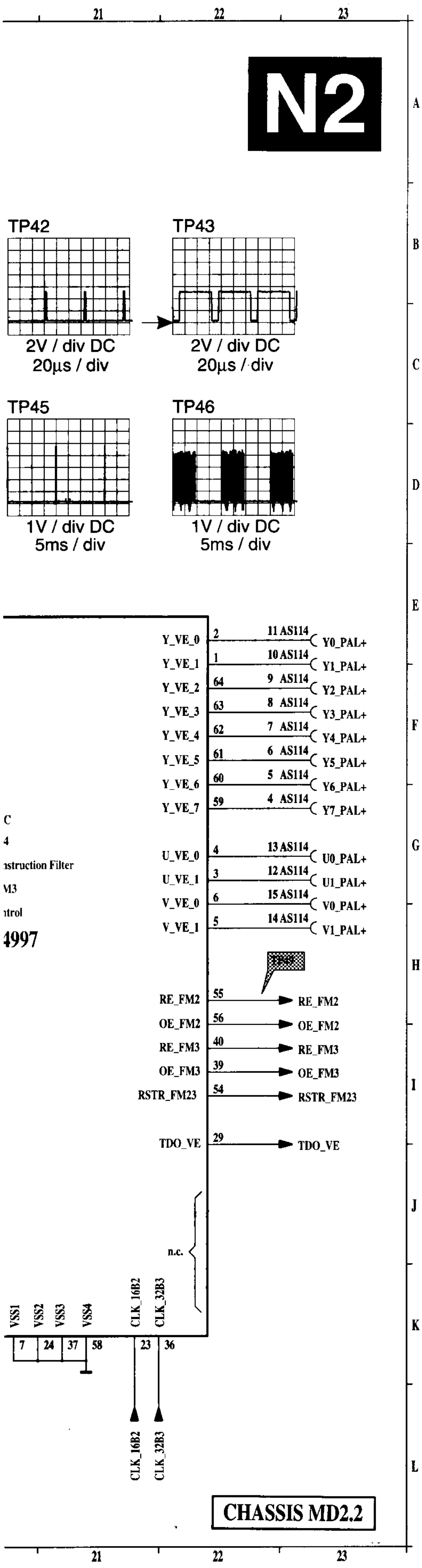

N2
PALPLUS
Y_FRONT
U/V_FRONT
7001
MACPACIC
QFP100
SAA 499
UB-Decompanding
Motion adaptive
Luma/Chroma
Separation
H/V-Counter
H/V-Decoder
Memory Control
PALplus Control
Clock Generation
Sync. Generation
UART Interface
Y_FRONT[0] 17 Y_ADC_0
Y_FRONT[1] 18 Y_ADC_1
Y_FRONT[2] 19 Y_ADC_2
Y_FRONT[3] 20 Y_ADC_3
Y_FRONT[4] 21 Y_ADC_4
Y_FRONT[5] 22 Y_ADC_5
Y_FRONT[6] 23 Y_ADC_6
Y_FRONT[7] 24 Y_ADC_7
U_FRONT[0] 15 U_ADC_0
U_FRONT[1] 16 U_ADC_1
V_FRONT[0] 13 V_ADC_0
V_FRONT[1] 14 V_ADC_1
7000
TMS4C2970
FM1
SSOP36
Y0_FRONT 30 AS114 Y_FRONT[0]
Y1_FRONT 31AS114 Y_FRONT[1]
Y2_FRONT 32 AS114 Y_FRONT[2]
Y3_FRONT 33 AS114 Y_FRONT[3]
Y4_FRONT 34 AS114 Y_FRONT[4]
Y5_FRONT 35 AS114 Y_FRONT[5]
Y6_FRONT 36 AS114 Y_FRONT[6]
Y7_FRONT 37 AS114 Y_FRONT[7]
U0_FRONT 28 AS114 U_FRONT[0]
U1_FRONT 29 AS114 U_FRONT[1]
V0_FRONT 26 AS114 V_FRONT[0]
V1_FRONT 27 AS114 V_FRONT[1]
Y
U/V
Y_FRONT[0] 6
Y_FRONT[1] 7
Y_FRONT[2] 8
Y_FRONT[3] 9
Y_FRONT[4] 10
Y_FRONT[5] 11
Y_FRONT[6] 12
Y_FRONT[7] 13
U_FRONT[0] 4
U_FRONT[1] 5
V_FRONT[0] 2
V_FRONT[1] 3
31 Y_FM1[0]
30 Y_FM1[1]
29 Y_FM1[2]
28 Y_FM1[3]
27 Y_FM1[4]
26 Y_FM1[5]
25 Y_FM1[6]
24 Y_FM1[7]
33 U_FM1[0]
32 U_FM1[1]
35 V_FM1[0]
34 V_FM1[1]
Y_FM1[0] 8 Y_FM1_0
Y_FM1[1] 7 Y_FM1_1
Y_FM1[2] 6 Y_FM1_2
Y_FM1[3] 5 Y_FM1_3
Y_FM1[4] 4 Y_FM1_4
Y_FM1[5] 3 Y_FM1_5
Y_FM1[6] 2 Y_FM1_6
Y_FM1[7] 1 Y_FM1_7
U_FM1[0] 11 U_FM1_0
U_FM1[1] 12 U_FM1_1
V_FM1[0] 9 V_FM1_0
V_FM1[1] 10 V_FM1_1
CLK_16 14 SWCK
RST_FM14 15 RSTW
WE_FM1 16 WE
17 IE
VCC1 VCC2 VSS1 VSS2
18 19 1 36
SRCK 23 CLK_16B1
RSTR 22 RST_FM14
RE 21 RE_FM1
OE 20
2000 100N
+5V 5000
SNERT_DA 2 AS114 SNERT_DA
SNERT_RST 3 AS114 SNERT_RST
SNERT_CL 38 AS114 SNERT_CL
CLK_32PAL+ 19 AS114 CLK_32B2
CLK_32 20 AS114 CLK_32
CLK_16PAL+ 18AS114 CLK_16B3
CLK_16 25 AS114 CLK_16
WE_PAL+ 17AS114 WE_MA
CLAMP 23 AS114 CLAMP
WE_FRONT 24 AS114 WE_FRONT
VA_FRONT 39 AS114 VA_FRONT
VA_AI 40 AS114 3006 100E VA_AI
+5V 3009 10K
GND_0 1 AS114
FF-Freeze 16AS114 4001 FF-Freeze
+5V_2 22 AS114 +5V
GND_2 21AS114
CLK_16 27 CLK_16
CLK_32 5100 102H 33 CLK_32
WE_FRONT 36 WE_FRONT
VA_FRONT 81 VA_FRONT
CLAMP 29 CLAMP
SNERT_DA 82 SNERT_DA
SNERT_CL 83 SNERT_CL
SNERT_RST 84 SNERT_RST
30 TEST1
32 TEST2
34 TEST3
TRSTN 69 TRSTN
TDI 70 TDI
TMS 71 TMS
TCK 72 TCK
U/V
7002
TMS4C2970
FM4
SSOP36
V_TO_FM4[1] 10
V_TO_FM4[0] 11
U_TO_FM4[1] 12
U_TO_FM4[0] 13
27 V_FM4[1]
26 V_FM4[0]
25 U_FM4[1]
24 U_FM4[0]
U_TO_FM4[0] 92 U_TO_FM4_0
U_TO_FM4[1] 91 U_TO_FM4_1
V_TO_FM4[0] 90 V_TO_FM4_0
V_TO_FM4[1] 89 V_TO_FM4_1
U_FM4[0] 85 U_FM4_0
U_FM4[1] 86 U_FM4_1
V_FM4[0] 87 V_FM4_0
V_FM4[1] 88 V_FM4_1
CLK_16B1 14 SWCK
RST_FM14 15 RSTW
WE_FM4 16 WE
17 IE
SRCK 23 CLK_16B1
RSTR 22 RST_FM14
RE 21 RE_FM4
OE 20
VDD1 VDD2 VDD3 VDD4 VDD5
25 49 67 73 96
+5V 5001
2001 100N
2006 100N
TRSTN 1 BST1 TRSTN
TDO 2 BST1 TDO_VE
TDI 3 BST1 TDI
TMS 4 BST1 TMS
TCK 5 BST1 TCK
GND 6 BST1
3001 1K2
2012 100N
2002 100N
TP41
TP42
TP43
TP44
TP45
A B C D E F G H I J K L
1 2 3 4 5 6 7 8 9 10

Platine PALplus



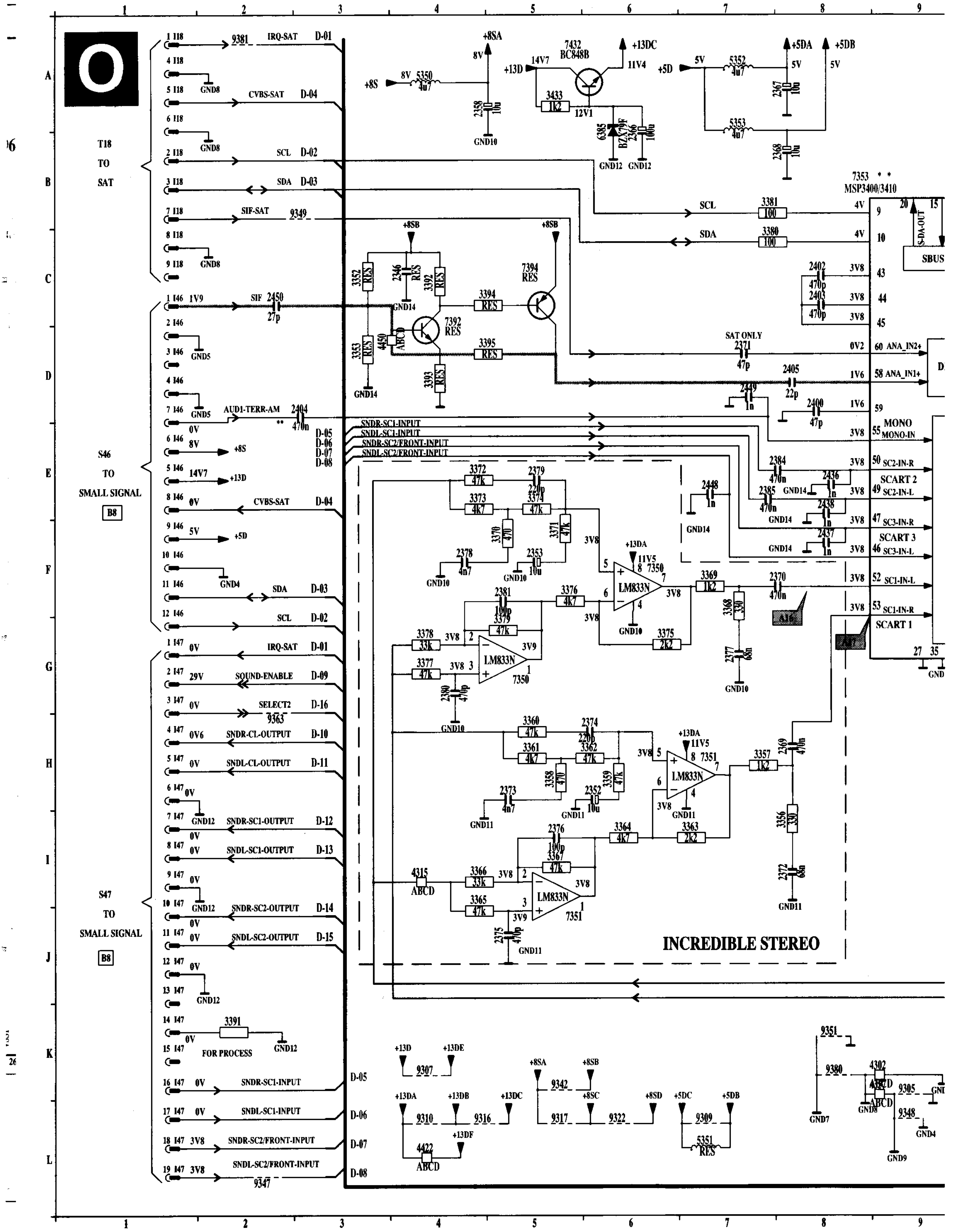
11
12
13
14
15
16
17
18
19
20
Y_MA_0
Y_MA_1
Y_MA_2
Y_MA_3
Y_MA_4
Y_MA_5
Y_MA_6
Y_MA_7
U_MA_0
U_MA_1
V_MA_0
V_MA_1
Y_TO_FM1_0
Y_TO_FM1_1
Y_TO_FM1_2
Y_TO_FM1_3
Y_TO_FM1_4
Y_TO_FM1_5
Y_TO_FM1_6
Y_TO_FM1_7
U_TO_FM1_0
WE_FM2/U_TO_FM1_1
RSTW_FM23/V_TO_FM1_0
WE_FM3/V_TO_FM1_1
WE_FM2
RSTW_FM23
WE_FM3
WE_FM1
RE_FM1
RST_FM14
WE_FM4
RE_FM4
CLK_16B1
CLK_16B2
CLK_16B3
CLK_32B1
CLK_32B2
CLK_32B3
3002 100
3003 100
3004 22
3005 100
3007 22
3008 100
HREF_MA
TDO_MA
WE_MA
FILM
EVEN_FIELD
INTPOL
VA_AI
VERIC_AV_N
VSS2
VSS3
VSS4
VSS5
26
50
66
74
97
7003
TMS4C2970
FM2
SSOP36
7004
TMS4C2970
FM3
SSOP36
Y_MA[0]
Y_MA[1]
Y_MA[2]
Y_MA[3]
Y_MA[4]
Y_MA[5]
Y_MA[6]
Y_MA[7]
U_MA[0]
U_MA[1]
V_MA[0]
V_MA[1]
Y_FM23[0]
Y_FM23[1]
Y_FM23[2]
Y_FM23[3]
Y_FM23[4]
Y_FM23[5]
Y_FM23[6]
Y_FM23[7]
U_FM23[0]
U_FM23[1]
V_FM23[0]
V_FM23[1]
SWCK
RSTW
WE
IE
SRCK
RSTR
RE
OE
VCC1
VCC2
VSS1
VSS2
FF-Freeze
CLK_32B1
RSTW_FM23
WE_FM2
WE_FM3
CLK_32B3
RSTR_FM23
RE_FM2
OE_FM2
RE_FM3
OE_FM3
+5V
5003
2003 100N
5004
2004 100N
U/V
Y
TP41
2V / div DC
20µs / div
TP44
1V / div DC
5ms / div
TP48
Y_FM23_0
Y_FM23_1
Y_FM23_2
Y_FM23_3
Y_FM23_4
Y_FM23_5
Y_FM23_6
Y_FM23_7
U_FM23_0
U_FM23_1
V_FM23_0
V_FM23_1
7005
VERI
QFP6
Inverse QMF Reco
FM2/F
Read Co
SAA
HREF_MA
WE_MA
VA_AI
FILM
EVEN_FIELD
INTPOL
TRSTN
TDO_MA
TDI
TMS
TCK
TEST1
TEST2
TEST3
VDD1
VDD2
VDD3
VDD4
8
25
38
57
5005
2005 100N
2015 100N
2016 100N

PALplus panel / PALplus-Pla

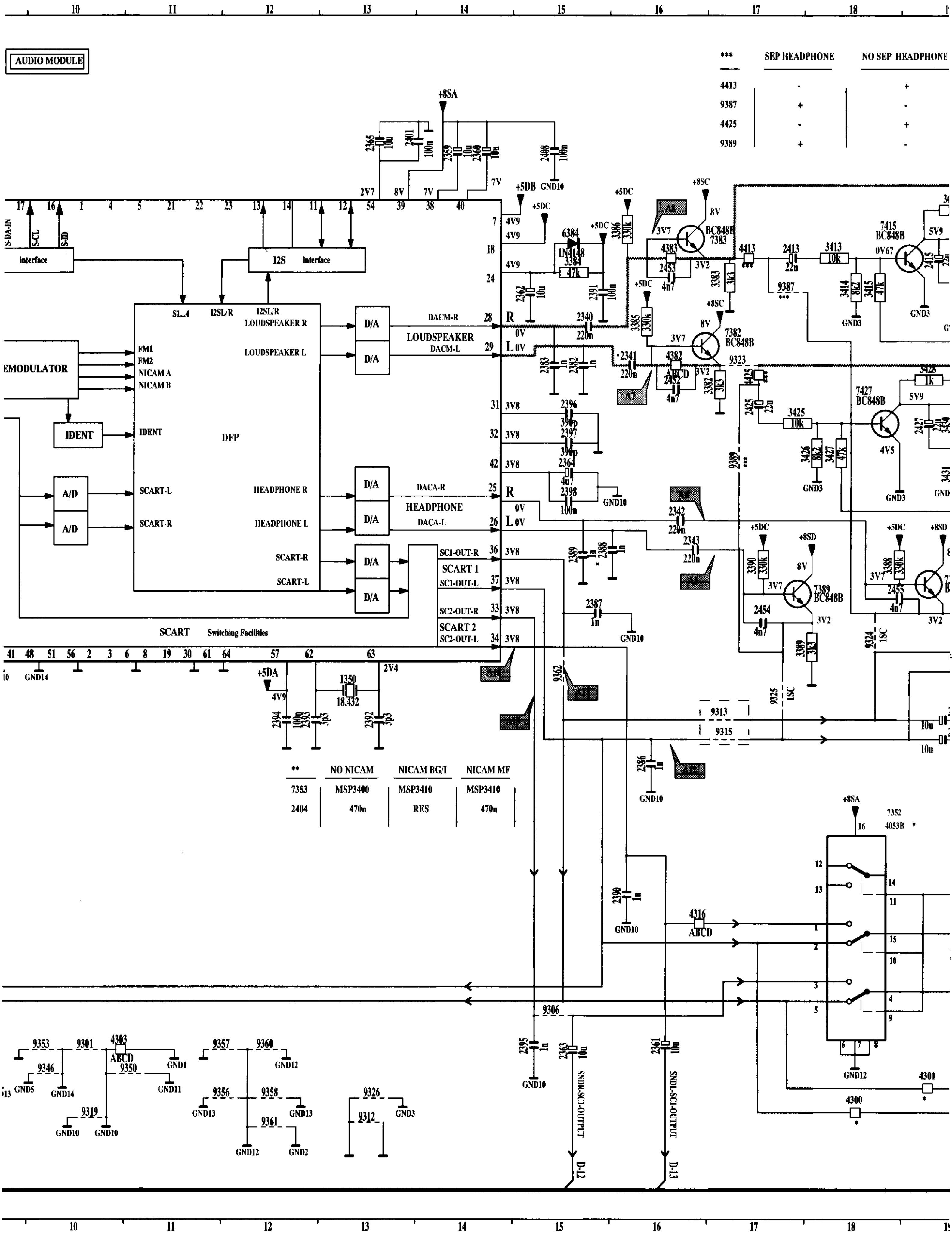

21
22
23
N2
TP42
2V / div DC
20µs / div
TP43
2V / div DC
20µs / div
TP45
1V / div DC
5ms / div
TP46
1V / div DC
5ms / div
A
B
C
D
E
F
G
H
I
J
K
L
Y_VE_0
2
11 AS114
Y0_PAL+
Y_VE_1
1
10 AS114
Y1_PAL+
Y_VE_2
64
9 AS114
Y2_PAL+
Y_VE_3
63
8 AS114
Y3_PAL+
Y_VE_4
62
7 AS114
Y4_PAL+
Y_VE_5
61
6 AS114
Y5_PAL+
Y_VE_6
60
5 AS114
Y6_PAL+
Y_VE_7
59
4 AS114
Y7_PAL+
C
4
ıstruction Filter
M3
ıtrol
4997
U_VE_0
4
13 AS114
U0_PAL+
U_VE_1
3
12 AS114
U1_PAL+
V_VE_0
6
15 AS114
V0_PAL+
V_VE_1
5
14 AS114
V1_PAL+
RE_FM2
55
RE_FM2
OE_FM2
56
OE_FM2
RE_FM3
40
RE_FM3
OE_FM3
39
OE_FM3
RSTR_FM23
54
RSTR_FM23
TDO_VE
29
TDO_VE
n.c.
VSS1
VSS2
VSS3
VSS4
CLK_16B2
CLK_32B3
7
24
37
58
23
36
CLK_16B2
CLK_32B3
CHASSIS MD2.2
21
22
23

2000	G 6
2001	L 9
2002	L 4
2003	E15
2004	I15
2005	K19
2006	L 9
2012	L 3
2015	K20
2016	K20
3001	L 3
3002	H12
3003	H12
3004	H12
3005	I12
3006	I 2
3007	I12
3008	I12
3009	J 2
4001	J 2
5000	H 4
5001	K 8
5003	D14
5004	I14
5005	K19
5100	F 8
7000	D 5
7001	A10
7002	I 5
7003	A15
7004	F15
7005	G20
AS114	I 2
AS114	I 2
AS114	I 2
AS114	K 2
AS114	J 2
AS114	J 2
AS114	J 2
AS114	H 2
AS114	H 2
AS114	G 2
AS114	G 2
AS114	G 2
AS114	G 2
AS114	G 2
AS114	F 2
AS114	F 2
AS114	F 2
AS114	F 2
AS114	E 2
AS114	E 2
AS114	E 2
AS114	E 2
AS114	E 2
AS114	D 2
AS114	D 2
AS114	D 2
AS114	D 2
AS114	D 2
AS114	H22
AS114	G22
AS114	G22
AS114	G22
AS114	G22
AS114	F22
AS114	F22
AS114	F22
AS114	F22
AS114	F22
AS114	E22
AS114	E22
BST1	L 2
BST1	L 2
BST1	L 2
BST1	L 2
BST1	L 2
BST1	K 2

Audio module (no dolby) /


O
T18
TO
SAT
S46
TO
SMALL SIGNAL
B8
S47
TO
SMALL SIGNAL
B8
IRQ-SAT D-01
CVBS-SAT D-04
SCL D-02
SDA D-03
SIF-SAT
9381
9349
GND8
SIF 2450 27p
AUD1-TERR-AM 2404 470n
+8S
+13D
+5D
CVBS-SAT D-04
SDA D-03
SCL D-02
GND5
GND4
IRQ-SAT D-01
SOUND-ENABLE D-09
SELECT2 D-16
9363
SNDR-CL-OUTPUT D-10
SNDL-CL-OUTPUT D-11
SNDR-SC1-OUTPUT D-12
SNDL-SC1-OUTPUT D-13
SNDR-SC2-OUTPUT D-14
SNDL-SC2-OUTPUT D-15
GND12
3391
FOR PROCESS
SNDR-SC1-INPUT D-05
SNDL-SC1-INPUT D-06
SNDR-SC2/FRONT-INPUT D-07
SNDL-SC2/FRONT-INPUT D-08
9347
+8SA
+8S 8V 5350 4u7
2358 10u
GND10
7432 BC848B
+13D 14V7
3433 1k2
12V1
+13DC 11V4
6385 BZX79F
2366 100u
GND12
+5D 5V
5352 4u7
5353 4u7
2367 10u
2368 10u
+5DA
+5DB
+8SB
3352 RES
2346 RES
3392 RES
GND14
7394 RES
3394 RES
7392 RES
4450 ABCD
3353 RES
3395 RES
3393 RES
7353
MSP3400/3410
SCL 3381 100
SDA 3380 100
S-DA-OUT
SBUS
2402 470p
2403 470p
SAT ONLY
2371 47p
2405 22p
2449 1n
2400 47p
60 ANA_IN2+
58 ANA_IN1+
59
MONO
55 MONO-IN
50 SC2-IN-R
SCART 2
49 SC2-IN-L
47 SC3-IN-R
SCART 3
46 SC3-IN-L
52 SC1-IN-L
53 SC1-IN-R
SCART 1
2384 470n
2385 470n
2436 1n
2438 1n
2437 1n
2448 1n
3372 47k
2379 220p
3373 4k7
3374 47k
3370 470
3371 47k
2378 4n7
2353 10u
+13DA
11V5
7350
LM833N
3369 1k2
2370 470n
3368 330
2377 68n
2381 100p
3379 47k
3376 4k7
3375 2k2
3378 33k
3377 47k
2380 470p
3360 47k
2374 220p
3361 4k7
3362 47k
3358 470
3359 47k
2373 4n7
2352 10u
7351
3357 1k2
2369 470n
3356 330
2372 68n
2376 100p
3367 47k
3364 4k7
3363 2k2
4315 ABCD
3366 33k
3365 47k
2375 470p
GND11
INCREDIBLE STEREO
9307
+13DE
9342
9310
9316
9317
9322
9309
5351 RES
4422 ABCD
+13DF
9351
9380
4302 ABCD
9305
9348
GND7
GND9

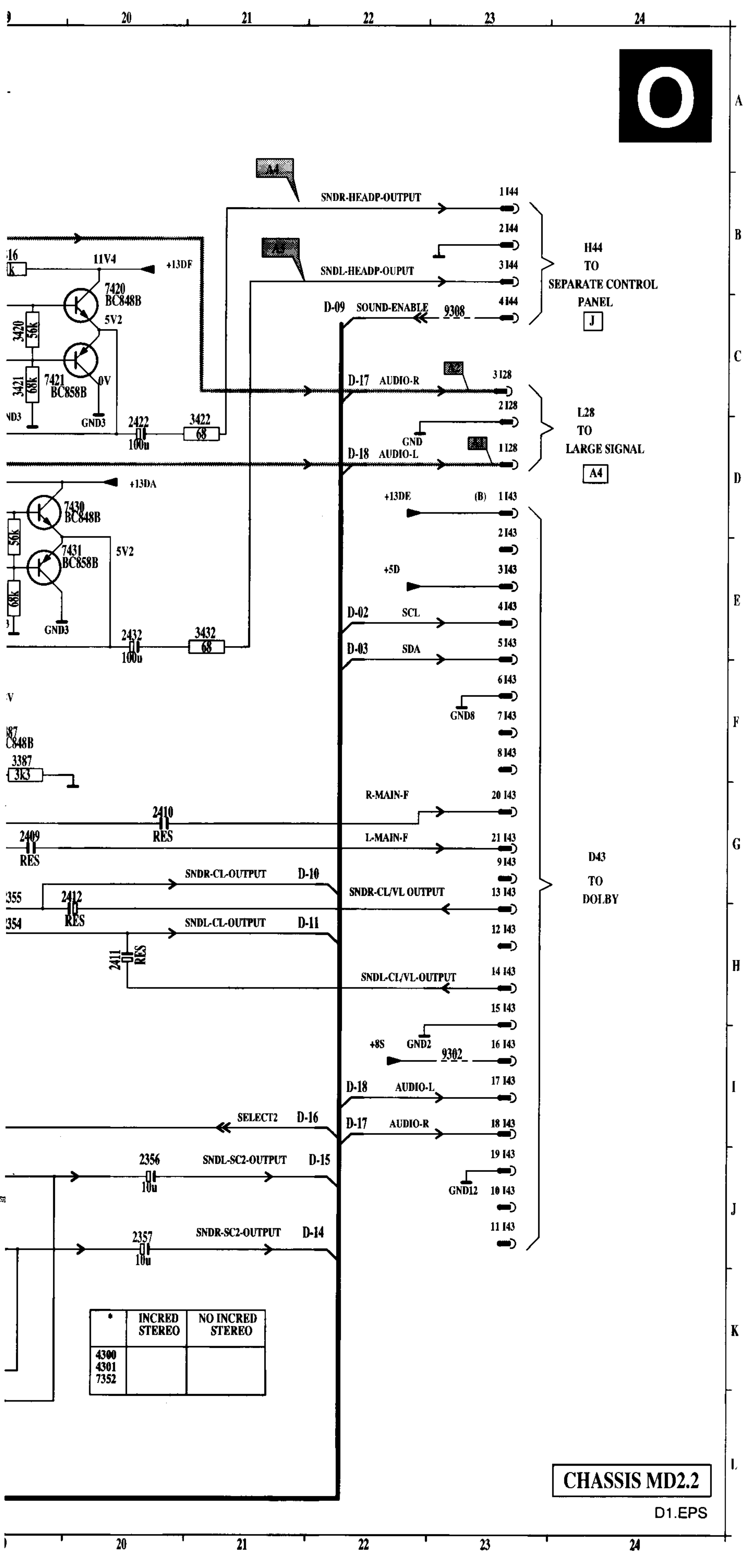
Audio-Modul (kein Dolby) /


AUDIO MODULE
+8SA
DFP
EMODULATOR
IDENT
A/D
D/A
FM1
FM2
NICAM A
NICAM B
SCART-L
SCART-R
LOUDSPEAKER R
LOUDSPEAKER L
HEADPHONE R
HEADPHONE L
I2S interface
S1...4
I2SL/R
DACM-R
DACM-L
LOUDSPEAKER
DACA-R
DACA-L
HEADPHONE
SC1-OUT-R
SC1-OUT-L
SCART 1
SC2-OUT-R
SC2-OUT-L
SCART 2
SCART Switching Facilities
+5DB
+5DC
+5DA
+8SC
+8SD
GND10
GND3
1N4148
BC848B
7383
7382
7389
7415
7427
1350
18.432
7352
4053B
9306
SNDR-SC1-OUTPUT
SNDL-SC1-OUTPUT
D-12
D-13
10
11
12
13
14
15
16
17
18

***	SEP HEADPHONE	NO SEP HEADPHONE
4413	-	+
9387	+	-
4425	-	+
9389	+	-

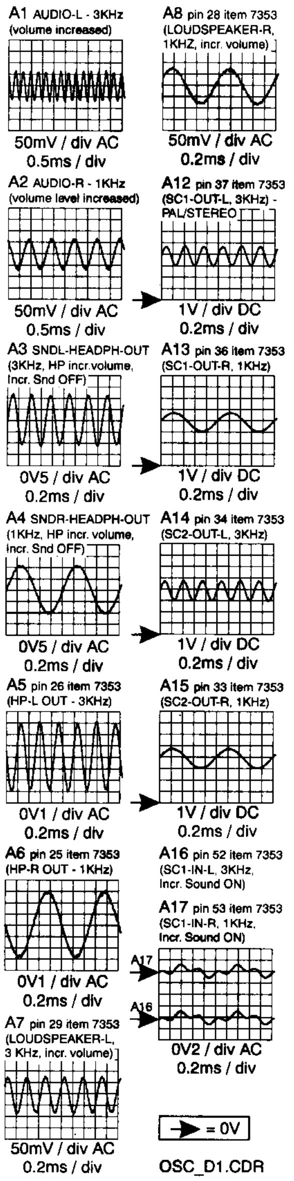
**	NO NICAM	NICAM BG/I	NICAM MF
7353	MSP3400	MSP3410	MSP3410
2404	470n	RES	470n

Module audio (non Dolby)


20
21
22
23
24
O
A
B
C
D
E
F
G
H
I
J
K
L
A4
SNDR-HEADP-OUTPUT
1 I44
2 I44
A3
SNDL-HEADP-OUPUT
3 I44
4 I44
H44
TO
SEPARATE CONTROL
PANEL
J
D-09
SOUND-ENABLE
9308
16
11V4
+13DF
7420
BC848B
5V2
3420
56k
7421
BC858B
0V
3421
68k
ND3
GND3
2422
100u
3422
68
D-17
AUDIO-R
A2
3 I28
2 I28
GND
A1
1 I28
D-18
AUDIO-L
L28
TO
LARGE SIGNAL
A4
+13DA
7430
BC848B
56k
7431
BC858B
5V2
68k
GND3
2432
100u
3432
68
+13DE
(B)
1 I43
2 I43
+5D
3 I43
D-02
SCL
4 I43
D-03
SDA
5 I43
6 I43
GND8
7 I43
8 I43
V
87
C848B
3387
3K3
R-MAIN-F
2410
RES
20 I43
2409
RES
L-MAIN-F
21 I43
9 I43
SNDR-CL-OUTPUT
D-10
355
2412
RES
SNDR-CL/VL OUTPUT
13 I43
354
SNDL-CL-OUTPUT
D-11
12 I43
2411
RES
SNDL-CL/VL-OUTPUT
14 I43
15 I43
+8S
GND2
9302
16 I43
D-18
AUDIO-L
17 I43
SELECT2
D-16
D-17
AUDIO-R
18 I43
2356
10u
SNDL-SC2-OUTPUT
D-15
19 I43
GND12
10 I43
2357
10u
SNDR-SC2-OUTPUT
D-14
11 I43
D43
TO
DOLBY
CHASSIS MD2.2
D1.EPS

*	INCRED STEREO	NO INCRED STEREO
4300 4301 7352		

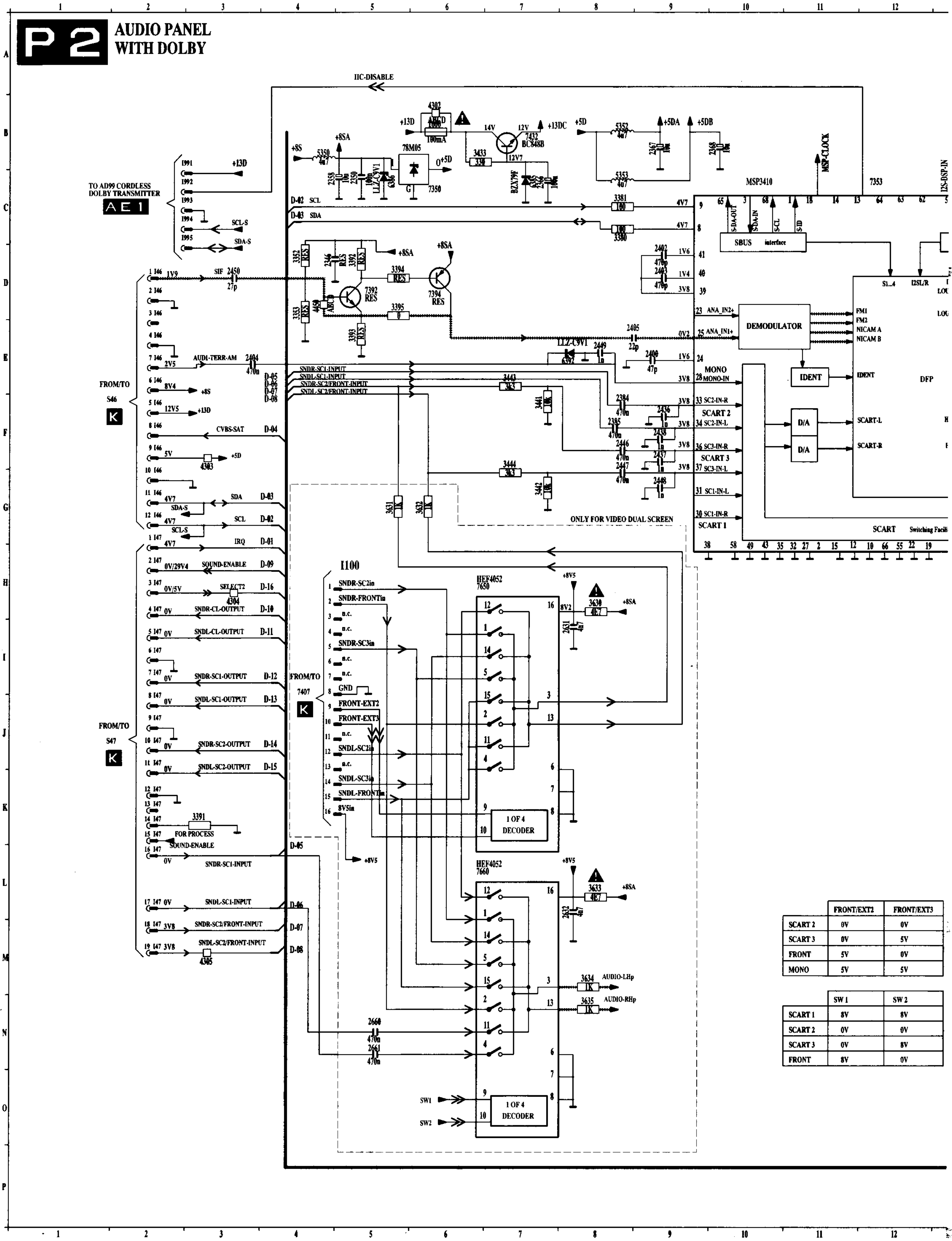
1350	G13
2340	C15
2341	D16
2342	E16
2343	F16
2346	C 4
2352	H 6
2353	F 5
2354	H19
2355	G19
2356	J20
2357	J20
2358	A 4
2359	B14
2360	B14
2361	K16
2362	C15
2363	K15
2364	E15
2365	B13
2366	A 6
2367	A 8
2368	B 8
2369	H 8
2370	F 8
2371	D 7
2372	I 8
2373	H 5
2374	H 6
2375	J 5
2376	I 5
2377	G 7
2378	F 4
2379	E 5
2380	G 4
2381	F 5
2382	D15
2383	D15
2384	E 8
2385	E 7
2386	H16
2387	F15
2388	F15
2389	F15
2390	I16
2391	C15
2392	H13
2393	H12
2394	H12
2395	K15
2396	D15
2397	E15
2398	E15
2400	D 8
2401	B13
2402	C 8
2403	C 8
2404	D 3
2405	D 8
2408	B15
2409	G19
2410	G20
2411	H20
2412	G20
2413	C17
2415	C19
2422	D20
2425	D17
2427	D19
2432	E20
2436	E 8
2437	F 8
2438	E 8
2448	E 7
2449	D 7
2450	C 2
2452	D16
2453	C16
2454	F17
2455	F18
3352	C 3
3353	D 3
3356	I 8
3357	H 7
3358	H 5
3359	H 6
3360	H 5
3361	H 5
3362	H 6
3363	I 7
3364	I 6
3365	I 4
3366	I 4
3367	I 5
3368	F 7
3369	F 7
3370	F 5
3371	F 5
3372	E 4
3373	E 4
3374	E 5
3375	G 6
3376	F 5
3377	G 4
3378	G 4
3379	G 5
3380	B 7
3381	B 7
3382	D17
3383	C17
3384	C15
3385	C16
3386	B16
3387	F19
3388	F18
3389	G17
3390	F17
3391	K 2
3392	C 4
3393	D 4
3394	C 5
3395	D 5
3413	C18
3414	C18
3415	C18
3416	B19
3420	C19
3421	C19
3422	D21
3425	D17
3426	E18
3427	E18
3428	D19
3430	D19
3431	E19
3432	E21
3433	A 5
4300	K18
4301	K19
4302	K 9
4303	K10
4315	I 4
4316	J16
4357	K 9
4382	D16
4383	C16
4413	C17
4422	L 4
4425	D17
4450	D 3
5350	A 4
5351	L 7
5352	A 7
5353	A 7
6384	C15
6385	A 6
7350	G 5
7350	F 6
7351	J 5
7351	H 7
7352	I18
7353	B 8
7382	D17
7383	C17
7387	F19
7389	F18
7392	C 4
7394	C 5
7415	B18
7420	B20
7421	C19
7427	D18
7430	D19
7431	E19
7432	A 5
9301	K10
9302	I23
9305	K 9
9306	J15
9307	K 4
9308	C23
9309	L 7
9310	L 4
9312	L13
9313	G17
9315	H17
9316	L 4
9317	L 5
9319	L10
9322	L 6
9323	D17
9324	G18
9325	G17
9326	K13
9342	K 5
9346	K10
9347	L 2
9348	L 9
9349	B 3
9350	K11
9351	K 8
9353	K10
9356	K12
9357	K12
9358	K12
9360	K12
9361	L12
9362	G15
9363	H 2
9380	K 8
9381	A 2
9387	C17
9389	E17
D-01	G 3
D-02	B 3
D-03	B 3
D-04	A 3
D-05	E 3
D-06	E 3
D-07	E 3
D-08	E 3
D-09	G 3
D-10	H 3
D-11	H 3
D-12	I 3
D-13	I 3
D-14	J 3
D-15	J 3
D-16	G 3
D-17	I22
D-18	I22
I18	C 1
I28	C23
I43	J23
I44	C23
I46	F 1
I47	L 1



Dolby audio module (with VDS audio processing) /

1350	H14	2350	C 5	2360	B15	2367	B 9	2387	G16	2394	H13	2402	D 9	2422	D21	2446	F 8	2454	G18
1600	B 6	2354	I18	2361	L17	2368	B10	2388	F16	2395	L15	2403	D 9	2425	E18	2447	F 8	2455	G19
2340	D16	2355	H18	2362	D16	2382	E16	2389	F16	2396	E16	2404	E 3	2427	E20	2448	G 9	2586	D25
2341	D17	2356	J19	2363	L16	2383	E16	2390	I16	2397	E16	2405	E 9	2432	E21	2449	E 8	2587	D25
2342	F17	2357	K19	2364	F16	2384	F 8	2391	C16	2398	F16	2408	B16	2436	F 9	2450	D 3	2588	D25
2343	F17	2358	C 4	2365	B14	2385	F 8	2392	H14	2400	E 9	2413	C18	2437	F 9	2452	E17	2589	D25
2346	D 4	2359	B15	2366	C 7	2386	I17	2393	H13	2401	B14	2415	C20	2438	F 9	2453	D17	2590	E28

2591	E28	2602	J23	2621	I29	2628	I27	2661	N 5	3384	D16	3391	K 3	3415	D19	3427	E19
2592	E29	2604	K24	2622	H29	2629	H30	3352	D 4	3385	D17	3392	D 5	3416	C20	3428	E20
2593	D30	2607	M26	2623	I29	2630	L30	3353	D 4	3386	C16	3393	E 5	3420	C20	3430	E20
2594	B28	2610	K26	2624	I29	2631	I 8	3380	C 8	3387	G20	3394	D 5	3421	D20	3431	E20
2595	B28	2618	F28	2625	K29	2632	L 8	3381	C 8	3388	G19	3395	D 5	3422	B21	3432	C21
2596	K23	2619	H27	2626	L29	2633	B23	3382	E17	3389	G18	3413	C19	3425	E18	3433	B 6
2600	J23	2620	G29	2627	L28	2660	N 5	3383	D17	3390	G18	3414	D19	3426	E18	3441	F 7

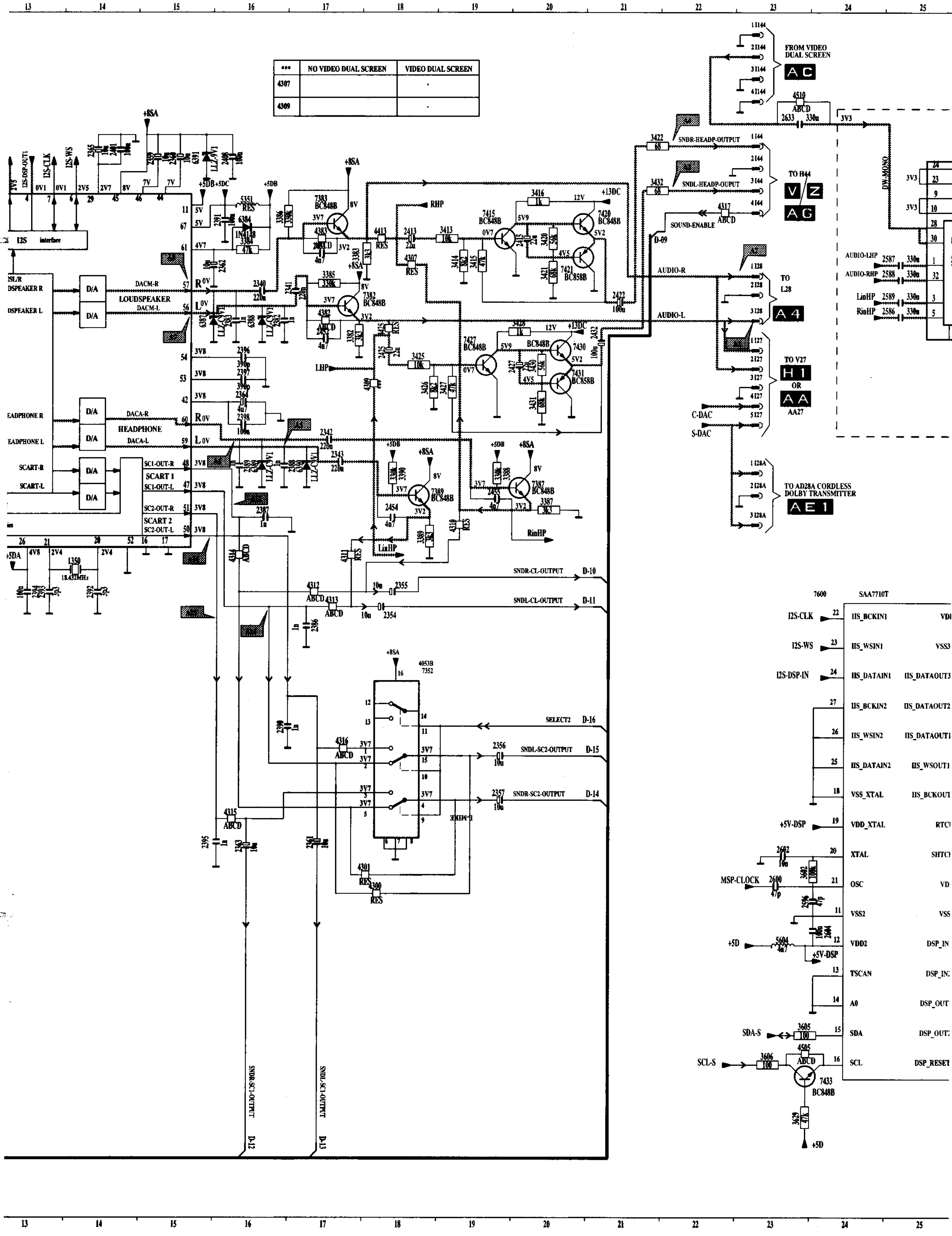

1
2
3
4
5
6
7
8
9
10
11
12
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
P 2
AUDIO PANEL
WITH DOLBY
IIC-DISABLE
4302
ABCD
100mA
+13D
14V
12V
7432
BC848B
+13DC
+5D
5352
4u7
+5DA
+5DB
2367
2368
5353
4u7
MSP-CLOCK
I2S-DSP-IN
+8SA
+8S
5350
4u7
78M05
7350
+5D
3433
330
12V7
BZX79F
6355
2358
2359
LLZ-C9V1
6360
TO AD99 CORDLESS
DOLBY TRANSMITTER
AE 1
1991
1992
1993
1994
1995
+13D
SCL-S
SDA-S
D-02 SCL
D-03 SDA
3381
100
3380
4V7
MSP3410
7353
9
8
65
3
68
1
18
14
13
64
63
62
S-DA-OUT
S-DA-IN
S-CL
S-ID
SBUS interface
3352
RES
2346
RES
3392
RES
+8SA
3394
RES
7392
RES
7394
RES
3395
0
3353
RES
4450
ABCD
3393
RES
2402
470p
2403
470p
1V6
1V4
3V8
41
40
39
S1...4
I2SL/R
LOU
FM1
FM2
NICAM A
NICAM B
23 ANA_IN2+
25 ANA_IN1+
DEMODULATOR
2405
22p
0V2
LLZ-C9V1
6392
2449
1n
2400
47p
1V6
24
MONO
28 MONO-IN
IDENT
DFP
1 146 1V9
SIF 2450
27p
2 146
3 146
4 146
7 146 2V5
AUDI-TERR-AM
2404
470n
6 146 8V4
+8S
5 146 12V5
+13D
8 146
CVBS-SAT
D-04
9 146 5V
4303
+5D
10 146
11 146 4V7
SDA-S
SDA
D-03
12 146 4V7
SCL-S
SCL
D-02
FROM/TO
S46
K
SNDR-SC1-INPUT
SNDL-SC1-INPUT
SNDR-SC2/FRONT-INPUT
SNDL-SC2/FRONT-INPUT
D-05
D-06
D-07
D-08
3443
3K3
3441
10K
2384
470n
2385
470n
2436
1n
2438
1n
3V8
33 SC2-IN-R
SCART 2
34 SC2-IN-L
2446
470n
2447
470n
2437
1n
2448
1n
36 SC3-IN-R
SCART 3
37 SC3-IN-L
31 SC1-IN-L
30 SC1-IN-R
SCART 1
D/A
SCART-L
SCART-R
3444
3K3
3442
10K
3631
1K
3632
1K
ONLY FOR VIDEO DUAL SCREEN
SCART
Switching Facili
38
58
49
43
35
32
27
2
15
12
10
66
55
22
19
1 147 4V7
IRQ
D-01
2 147 0V/29V4
SOUND-ENABLE
D-09
3 147 0V/5V
SELECT2
4304
D-16
4 147 0V
SNDR-CL-OUTPUT
D-10
5 147 0V
SNDL-CL-OUTPUT
D-11
6 147
7 147 0V
SNDR-SC1-OUTPUT
D-12
8 147 0V
SNDL-SC1-OUTPUT
D-13
9 147
10 147 0V
SNDR-SC2-OUTPUT
D-14
11 147 0V
SNDL-SC2-OUTPUT
D-15
12 147
13 147
14 147
3391
15 147
FOR PROCESS
SOUND-ENABLE
16 147
0V
SNDR-SC1-INPUT
D-05
17 147 0V
SNDL-SC1-INPUT
D-06
18 147 3V8
SNDR-SC2/FRONT-INPUT
D-07
19 147 3V8
SNDL-SC2/FRONT-INPUT
4305
D-08
FROM/TO
S47
K
I100
SNDR-SC2in
SNDR-FRONTin
n.c.
SNDR-SC3in
GND
FRONT-EXT2
FRONT-EXT3
SNDL-SC2in
SNDL-SC3in
SNDL-FRONTin
8V5in
FROM/TO
7407
K
+8V5
HEF4052
7650
+8V5
8V2
3630
4E7
+8SA
2631
4u7
16
12
1
14
5
15
2
11
4
3
13
6
7
9
8
10
1 OF 4
DECODER
HEF4052
7660
3633
4E7
2632
4u7
3634
1K
AUDIO-LHp
3635
1K
AUDIO-RHp
2660
470n
2661
470n
SW1
SW2

	FRONT/EXT2	FRONT/EXT3
SCART 2	0V	0V
SCART 3	0V	5V
FRONT	5V	0V
MONO	5V	5V

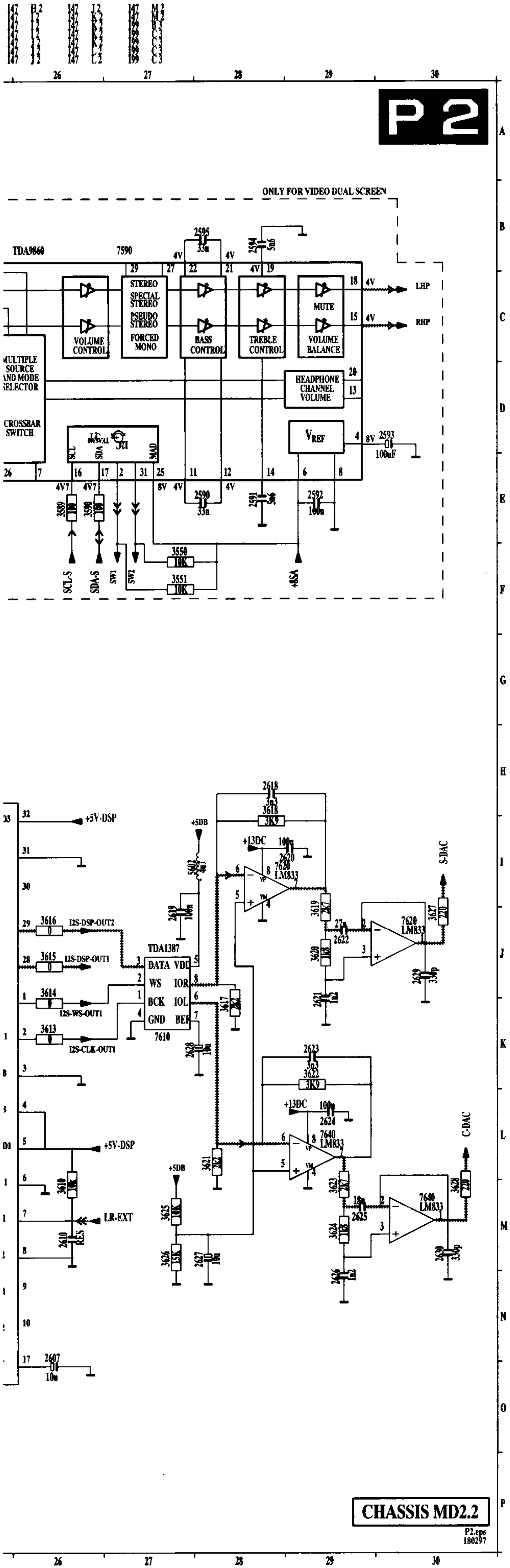
	SW 1	SW 2
SCART 1	8V	8V
SCART 2	0V	0V
SCART 3	0V	8V
FRONT	8V	0V

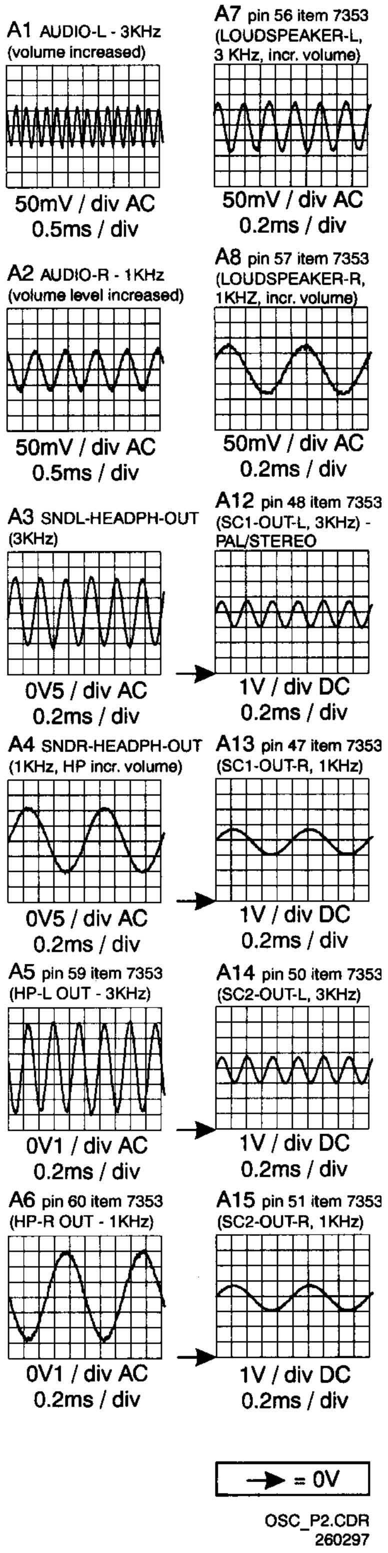
Dolby Audio Modul (mit VDS-Tonprozessor) /

3442	G 7
3443	E 7
3444	F 7
3550	E27
3551	E27
3589	E26
3590	E26
3602	J23
3605	L23
3606	M23
3610	K26
3613	I26
3614	I26
3615	H26
3616	H26
3617	I28
3618	G28
3619	H29
3620	H29
3621	K28
3622	J29
3623	K29
3624	K29
3625	K27
3626	L27
3627	H30
3628	K30
3629	M23
3630	H 8
3631	G 5
3632	G 6
3633	L 8
3634	M 8
3635	N 8
4300	L18
4301	L18
4302	B 6
4303	F 3
4304	H 3
4305	M 3
4307	D18
4309	E18
4310	G19
4311	H17
4312	H17
4313	H17
4314	H16
4315	K16
4316	J17
4317	C22
4382	D17
4383	C17
4413	C18
4425	E18
4450	D 4
4505	M23
4510	B23
5350	B 4
5351	C16
5352	B 8
5353	C 8
5602	G28
5604	K23
6384	C16
6385	C 7
6386	C 5
6387	E15
6388	E16
6389	F16
6390	F17
6391	B15
6392	E 8
7350	C 6
7352	I18
7353	C12
7382	D17
7383	C17
7387	G20
7389	G18
7392	D 5
7394	D 6
7415	C19
7420	C21
7421	D20
7427	E19
7430	E20
7431	E20
7432	B 7
7433	M24
7590	B27
7600	F24
7610	I27
7620	G28
7620	H30
7640	I29
7640	K30
7650	H 6
7660	L 6
1100	H 5
1144	A23
1144	A23
1144	A23
1144	A23
1144	A23
1127	E23
1127	E23
1127	E23
1127	F23
1127	F23
1128	D23
1128	D23
1128	D23
1128	D23
1128A	F23
1128A	G23
1128A	G23
1144	B23
1144	B23
1144	B23
1144	C23
1144	C23
1146	D 2
1146	D 2
1146	D 2
1146	E 2
1146	F 2
1146	F 2
1146	E 2
1146	E 2
1146	F 2
1146	F 2
1146	G 2
1146	G 2
1146	G 2
1146	G 2
1147	G 2
1147	H 2
1147	H 2


13
14
15
16
17
18
19
20
21
22
23
24
25
••• | NO VIDEO DUAL SCREEN | VIDEO DUAL SCREEN
4307 | | ·
4309 | | ·
FROM VIDEO DUAL SCREEN
AC
1I144
2I144
3I144
4I144
4510 ABCD
2633 330n
3V3
DW-MONO
3422 68
SNDR-HEADP-OUTPUT
3432 68
SNDL-HEADP-OUPUT
TO H44
V Z
A G
4317 ABCD
SOUND-ENABLE
D-09
AUDIO-R
AUDIO-L
TO L28
A 4
TO V27
H 1
OR
A A
AA27
C-DAC
S-DAC
TO AD28A CORDLESS DOLBY TRANSMITTER
A E 1
AUDIO-LHP 2587 330n
AUDIO-RHP 2588 330n
LinHP 2589 330n
RinHP 2586 330n
+8SA
+5DB
+5DC
12S-DSP-OUT1
12S-CLK
12S-WS
I2S interface
D/A
DACM-R
LOUDSPEAKER
DACM-L
DSPEAKER R
DSPEAKER L
EADPHONE R
EADPHONE L
DACA-R
HEADPHONE
DACA-L
SCART-R
SCART-L
SC1-OUT-R
SCART 1
SC1-OUT-L
SC2-OUT-R
SCART 2
SC2-OUT-L
5351 RES
6384 1N4148
3384 47k
7383 BC848B
7382 BC848B
7415 BC848B
7420 BC848B
7421 BC858B
7427 BC848B
7430 BC848B
7431 BC858B
7389 BC848B
7387 BC848B
RHP
LHP
LinHP
RinHP
+13DC
12V
1350 18.432MHz
SNDR-CL-OUTPUT D-10
SNDL-CL-OUTPUT D-11
4312 ABCD
4313 ABCD
4314 ABCD
4315 ABCD
4316 ABCD
4053B 7352
SELECT2 D-16
SNDL-SC2-OUTPUT D-15
SNDR-SC2-OUTPUT D-14
SNDR-SC1-OUTPUT D-12
SNDL-SC1-OUTPUT D-13
7600 SAA7710T
I2S-CLK
I2S-WS
I2S-DSP-IN
IIS_BCKIN1
IIS_WSIN1
IIS_DATAIN1
IIS_BCKIN2
IIS_WSIN2
IIS_DATAIN2
VSS_XTAL
VDD_XTAL
XTAL
OSC
VSS2
VDD2
TSCAN
A0
SDA
SCL
IIS_DATAOUT3
IIS_DATAOUT2
IIS_DATAOUT1
IIS_WSOUT1
IIS_BCKOUT
+5V-DSP
MSP-CLOCK
SDA-S
SCL-S
3605 100
3606 100
4505 ABCD
7433 BC848B
3629 47k
+5D
5604 4u7
DSP_RESET

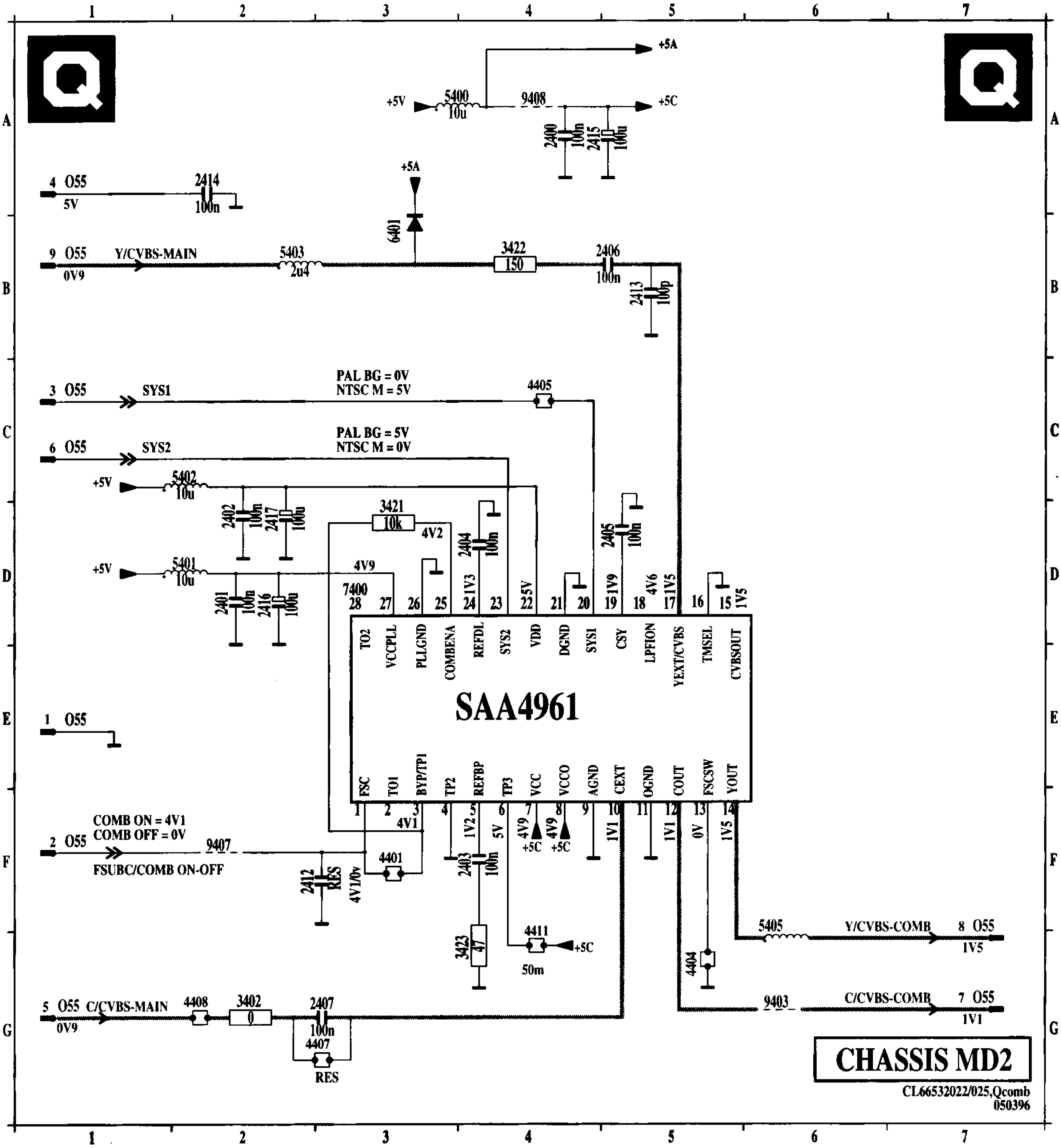
Module audio Dolby (avec traitement audio VDS)


P 2
ONLY FOR VIDEO DUAL SCREEN
TDA9860
7590
2595 33n
2594 5n6
VOLUME CONTROL
STEREO SPECIAL STEREO PSEUDO STEREO FORCED MONO
BASS CONTROL
TREBLE CONTROL
MUTE VOLUME BALANCE
LHP
RHP
MULTIPLE SOURCE AND MODE SELECTOR
CROSSBAR SWITCH
HEADPHONE CHANNEL VOLUME
VREF
2593 100uF
SCL SDA MAD
2590 33n
2591 5n6
2592 100n
3589 100
3590 100
3550 10K
3551 10K
SCL-S
SDA-S
SW1
SW2
+8SA
+5V-DSP
3616 I2S-DSP-OUT2
3615 I2S-DSP-OUT1
3614 I2S-WS-OUT1
3613 I2S-CLK-OUT1
TDA1387
DATA VDD
WS IOR
BCK IOL
GND BER
7610
+5DB
5602 4u7
2619 100n
2628 10u
3617 2K2
2618 3n3
3618 3K9
+13DC
2620 100n
7620 LM833
3619 2K7
2622 27n
3620 1K8
2621 1n2
7620 LM833
3627 220
2629 330p
S-DAC
2623 3n3
3622 3K9
2624 100n
7640 LM833
3621 2K2
3623 2K7
3624 1K8
2625 18n
2626 1n2
3628 220
2630 330p
C-DAC
3625 10K
3626 15K
2627 10u
3610 10K
2610 RES
LR-EXT
2607 10u
CHASSIS MD2.2
P2.eps 180297
26 27 28 29 30
A B C D E F G H I J K L M N O P

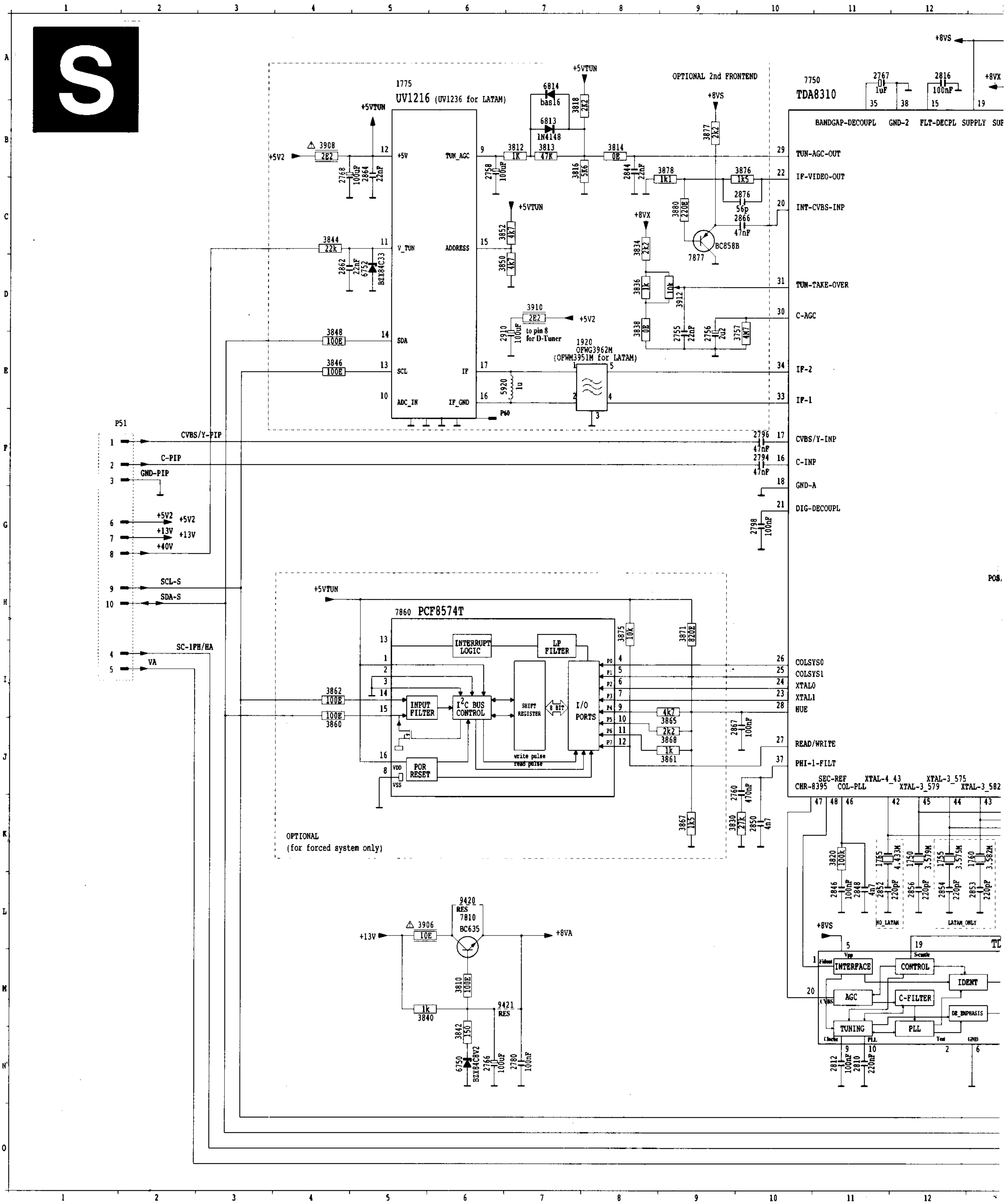


COMB filter module / Kammfilter-Modul / Module filtre en peigne

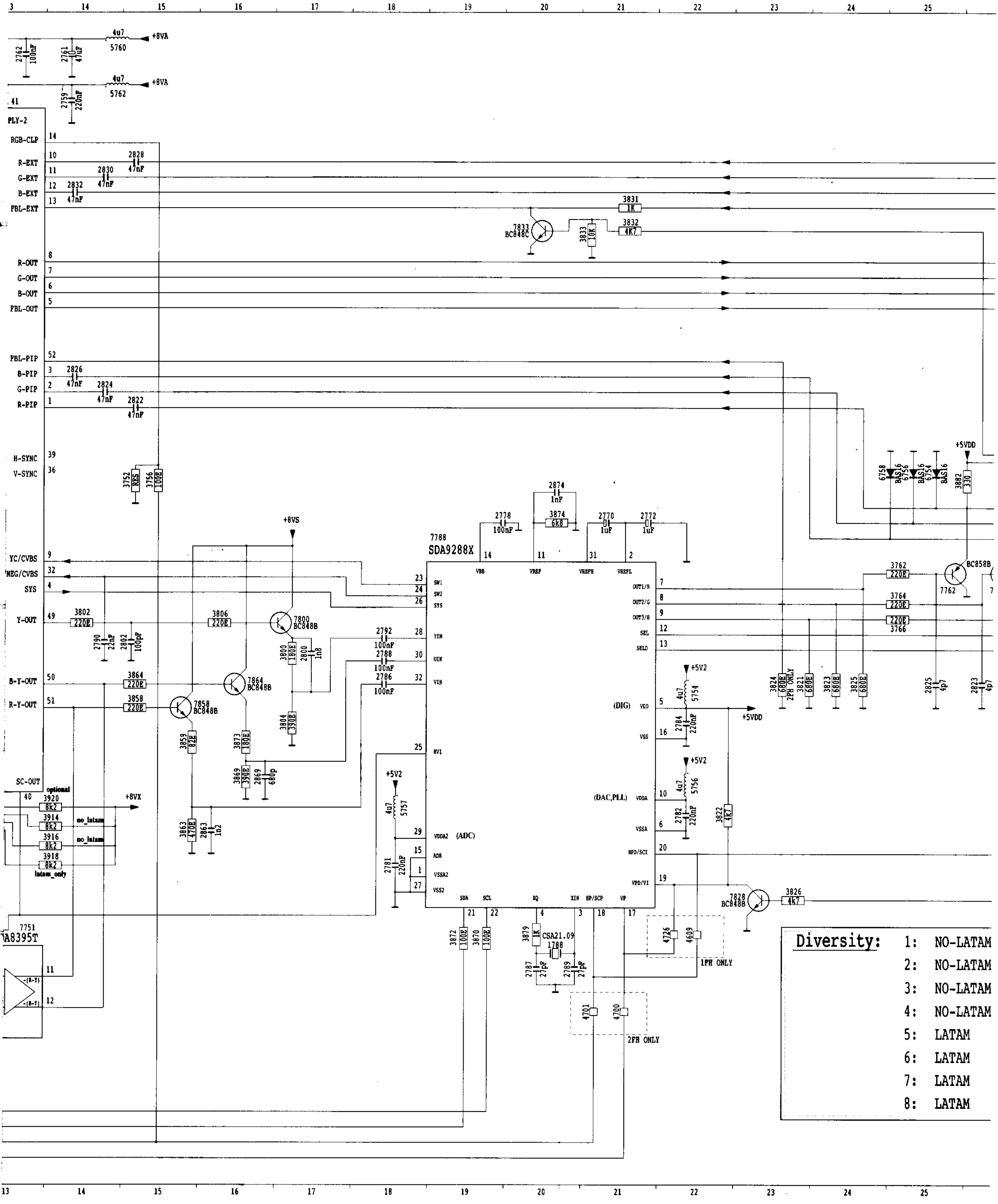
2400	A 4
2401	D 2
2402	D 2
2403	F 4
2404	D 4
2405	D 5
2406	B 5
2407	G 3
2412	F 2
2413	B 5
2414	A 2
2415	A 4
2416	D 2
2417	D 2
3401	B 3
3402	G 2
3421	D 3
3422	B 4
3423	G 4
4401	F 3
4404	G 5
4405	C 4
4407	G 3
4408	G 2
4411	F 4
5400	A 4
5401	D 2
5402	C 2
5403	B 2
5405	F 6
6401	B 3
7400	D 3
9403	G 6
9406	E 1
9407	F 2
9408	A 4
055	E 1
055	F 1
055	C 1
055	A 1
055	G 1
055	C 1
055	G 7
055	F 7
055	B 1


1 2 3 4 5 6 7
A B C D E F G
+5V
5400
10u
9408
+5A
+5C
2400
100n
2415
100u
4 055
5V
2414
100n
+5A
6401
9 055
0V9
Y/CVBS-MAIN
5403
2u4
3422
150
2406
100n
2413
100p
3 055
SYS1
PAL BG = 0V
NTSC M = 5V
4405
6 055
SYS2
PAL BG = 5V
NTSC M = 0V
+5V
5402
10u
2402
100n
2417
100u
3421
10k
4V2
2404
100n
2405
100n
+5V
5401
10u
2401
100n
2416
100u
4V9
7400
28 27 26 25 24 23 22 21 20 19 18 17 16 15
1V3
5V
1V9
4V6
1V5
1V5
TO2
VCCPLL
PLLGND
COMBENA
REFDL
SYS2
VDD
DGND
SYS1
CSY
LPFION
YEXT/CVBS
TMSEL
CVBSOUT
SAA4961
FSC
TO1
BYP/TP1
TP2
REFBP
TP3
VCC
VCCO
AGND
CEXT
OGND
COUT
FSCSW
YOUT
1 2 3 4 5 6 7 8 9 10 11 12 13 14
1 055
COMB ON = 4V1
COMB OFF = 0V
2 055
9407
FSUBC/COMB ON-OFF
4V1
4401
2412
RES
4V1/0V
1V2
5V
4V9
4V9
+5C
+5C
1V1
1V1
0V
1V5
2403
100n
3423
47
4411
+5C
50m
5405
Y/CVBS-COMB
8 055
1V5
4404
9403
C/CVBS-COMB
7 055
1V1
5 055
C/CVBS-MAIN
0V9
4408
3402
0
2407
100n
4407
RES
CHASSIS MD2
CL66532022/025,Qcomb
050396

PIP2 module /

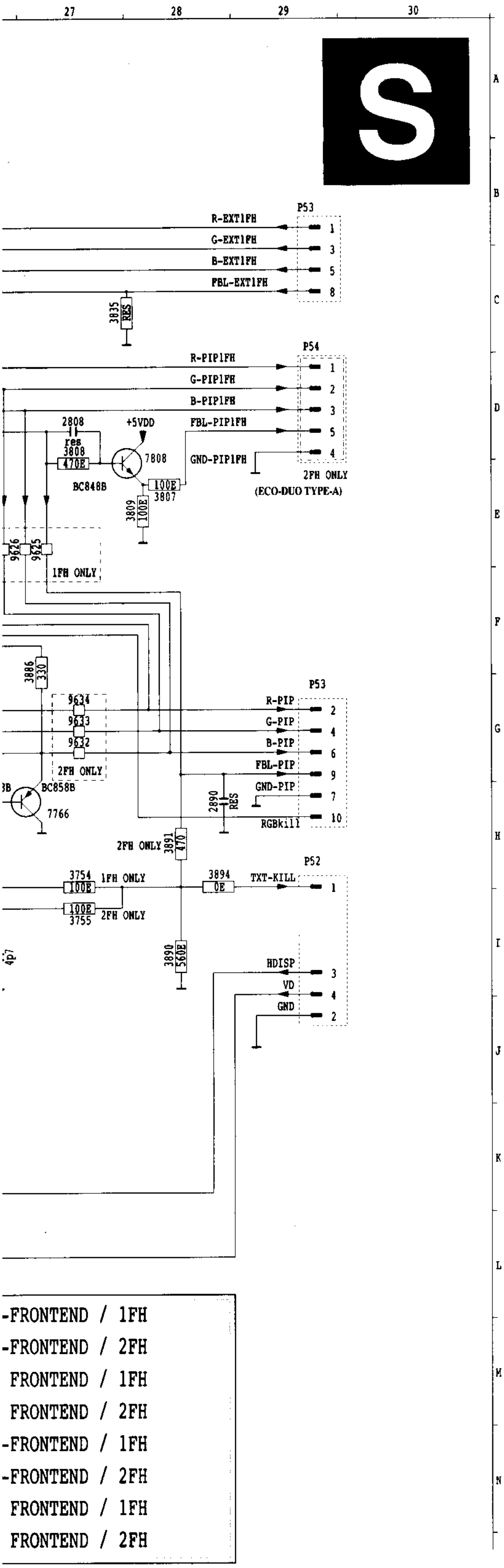

S
1 2 3 4 5 6 7 8 9 10 11 12
A B C D E F G H I J K L M N O
1775
UV1216 (UV1236 for LATAM)
+5VTUN
+5V2
3908
2E2
2768
100uF
2864
22nF
+5V
TUN_AGC
V_TUN
ADDRESS
SDA
SCL
IF
ADC_IN
IF_GND
P60
3844
22k
2862
22nF
6752
BZX84C33
3848
100E
3846
100E
6814
bas16
6813
1N4148
3812
1K
3813
47K
3818
2K2
3816
5K6
2758
100nF
3814
0E
2844
22nF
3852
4K7
3850
4K7
3910
2E2
+5V2
2910
100uF
to pin 8 for D-Tuner
5920
1u
1920
OFWG3962M
(OFWM3951M for LATAM)
OPTIONAL 2nd FRONTEND
+8VS
3877
2k2
3878
1k1
3876
1k5
2876
56p
2866
47nF
3880
220E
7877
BC858B
+8VX
3834
2k2
3836
1k
3912
10k
3838
0E
2755
22nF
2756
2u2
3757
4M7
7750
TDA8310
2767
1uF
2816
100nF
+8VX
BANDGAP-DECOUPL
GND-2
FLT-DECPL
SUPPLY
TUN-AGC-OUT
IF-VIDEO-OUT
INT-CVBS-INP
TUN-TAKE-OVER
C-AGC
IF-2
IF-1
CVBS/Y-INP
C-INP
GND-A
DIG-DECOUPL
2796
47nF
2794
47nF
2798
100nF
P51
CVBS/Y-PIP
C-PIP
GND-PIP
+5V2
+13V
+40V
SCL-S
SDA-S
SC-1FH/HA
VA
7860 PCF8574T
INTERRUPT LOGIC
LP FILTER
INPUT FILTER
I²C BUS CONTROL
SHIFT REGISTER
8 BIT
I/O PORTS
POR RESET
VDD
VSS
write pulse
read pulse
P0 P1 P2 P3 P4 P5 P6 P7
3862
100E
3860
100E
3875
10k
3871
820E
4k7
3865
2k2
3868
1k
3861
3867
1k5
2867
100nF
COLSYS0
COLSYS1
XTAL0
XTAL1
HUE
READ/WRITE
PHI-1-FILT
2760
470nF
3830
27k
2850
4n7
CHR-8395
SEC-REF
COL-PLL
XTAL-4_43
XTAL-3_579
XTAL-3_575
XTAL-3_582
3820
100k
2846
100nF
2848
4n7
1755
4.433M
2852
220pF
1750
3.579M
2856
220pF
1755
3.575M
2854
220pF
1760
3.582M
2853
220pF
NO_LATAM
LATAM_ONLY
OPTIONAL
(for forced system only)
POS.
+8VS
INTERFACE
CONTROL
IDENT
AGC
C-FILTER
DE_EMPHASIS
TUNING
PLL
Vpp
S-cradle
CVBS
Test
GND
2812
100nF
2810
220nF
TL
9420
RES
7810
BC635
3906
10E
+13V
+8VA
3810
100E
1k
3840
9421
RES
3842
150
6750
BZX84C8V2
2766
100uF
2780
100nF

PIP2-Modul


13
14
15
16
17
18
19
20
21
22
23
24
25
4u7
5760
+8VA
2762 100nF
2761 47uF
4u7
5762
+8VA
2759 220nF
41
PLY-2
RGB-CLP
R-EXT
G-EXT
B-EXT
FBL-EXT
2828 47nF
2830 47nF
2832 47nF
3831 1K
3832 4K7
7833 BC848C
3833 10K
R-OUT
G-OUT
B-OUT
FBL-OUT
FBL-PIP
B-PIP
G-PIP
R-PIP
2826 47nF
2824 47nF
2822 47nF
H-SYNC
V-SYNC
3752 RES
3756 100E
+5VDD
6758 BAS16
6756 BAS16
6754 BAS16
3882 330
2874 1nF
2778 100nF
3874 6k8
2770 1uF
2772 1uF
7788
SDA9288X
VBB
VREF
VREFH
VREFL
OUT1/R
OUT2/G
OUT3/B
SEL
SELD
SW1
SW2
SYS
YIN
UIN
VIN
HVI
VDDA2 (ADC)
ADR
VSSA2
VSS2
SDA
SCL
XQ
XIN
HP/SCP
VP
(DIG)
VDD
VSS
(DAC,PLL)
VDDA
VSSA
HPD/SCI
VPD/VI
+8VS
YC/CVBS
NEG/CVBS
SYS
Y-OUT
3802 220E
2790 22nF
2802 100pF
3806 220E
7800 BC848B
2792 100nF
2788 100nF
2786 100nF
3800 180E
2800 1n8
3804 390E
B-Y-OUT
R-Y-OUT
3864 220E
3858 220E
7864 BC848B
7858 BC848B
3859 82E
3873 180E
3869 390E
2869 680p
3863 470E
2863 1n2
SC-OUT
optional
3920 8k2
3914 8k2
3916 8k2
3918 8k2
no_latam
no_latam
latam_only
+8VX
+5V2
4u7
5757
2781 220nF
3762 220E
3764 220E
3766 220E
7762
BC858B
3824 680E 2FH ONLY
3821 680E
3823 680E
3825 680E
2825 4p7
2823 4p7
+5V2
4u7
5754
+5VDD
2784 220nF
+5V2
4u7
5756
2782 220nF
3822 4K7
7828 BC848B
3826 4k7
3872 100E
3870 100E
3879 1K
CSA21.09
1788
2787 27pF
2789 27pF
4726
4609
1PH ONLY
4701
4700
2FH ONLY
7751
A8395T
-(R-Y)
-(B-Y)
11
12

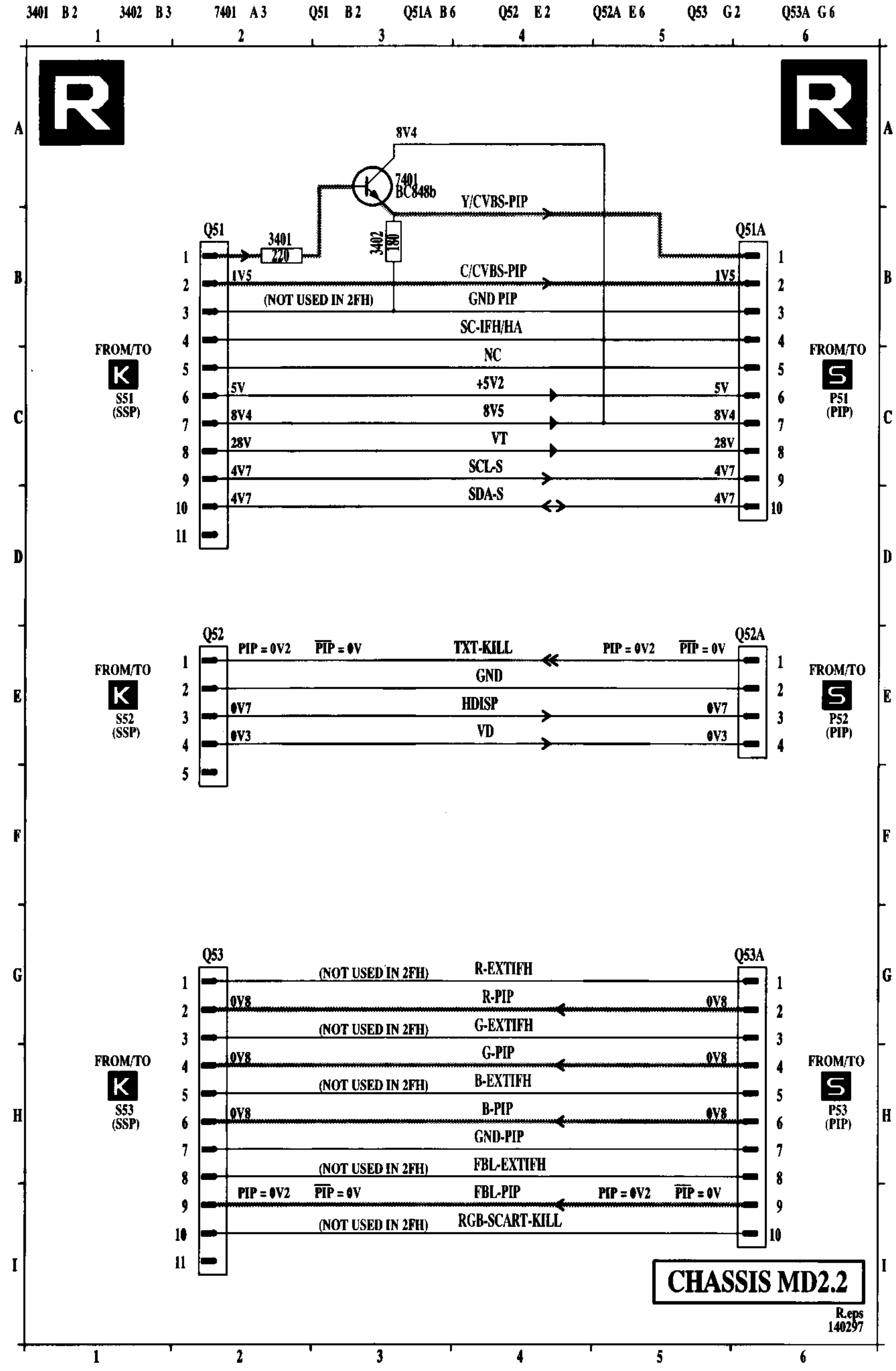
Diversity:		
	1:	NO-LATAM
	2:	NO-LATAM
	3:	NO-LATAM
	4:	NO-LATAM
	5:	LATAM
	6:	LATAM
	7:	LATAM
	8:	LATAM

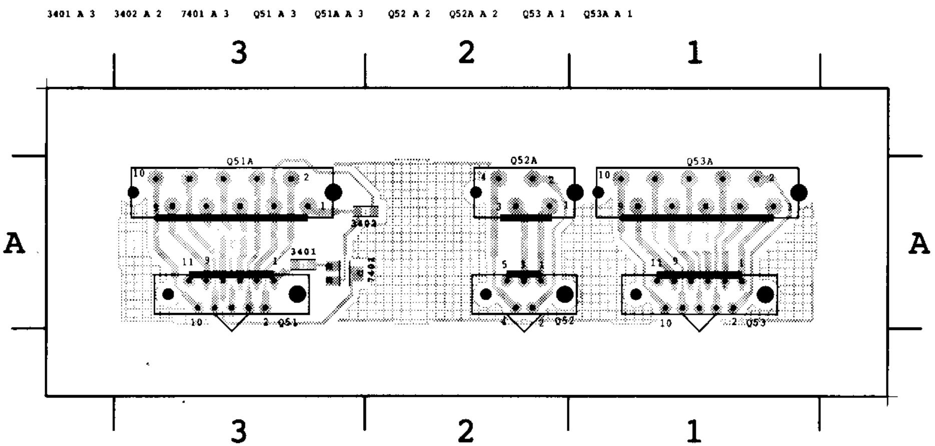
Module PIP2


27
28
29
30
S
A
B
C
D
E
F
G
H
I
J
K
L
M
N
P53
R-EXT1FH
G-EXT1FH
B-EXT1FH
FBL-EXT1FH
1
3
5
8
3835
RES
P54
R-PIP1FH
G-PIP1FH
B-PIP1FH
FBL-PIP1FH
GND-PIP1FH
1
2
3
5
4
2FH ONLY
(ECO-DUO TYPE-A)
2808
res
3808
470E
+5VDD
7808
BC848B
100E
3807
3809
100E
9626
9625
1FH ONLY
3886
330
P53
9634
9633
9632
2FH ONLY
R-PIP
G-PIP
B-PIP
FBL-PIP
GND-PIP
RGBkill
2
4
6
9
7
10
2890
RES
BC858B
7766
2FH ONLY
3891
470
P52
3754
100E
1FH ONLY
3894
0E
TXT-KILL
1
100E
3755
2FH ONLY
4p7
3890
560E
HDISP
VD
GND
3
4
2
-FRONTEND / 1FH
-FRONTEND / 2FH
FRONTEND / 1FH
FRONTEND / 2FH
-FRONTEND / 1FH
-FRONTEND / 2FH
FRONTEND / 1FH
FRONTEND / 2FH

1750	K12
1755	K12
1760	K13
1765	K11
1775	A 5
1788	M20
1920	E 7
2755	E 9
2756	E 9
2758	B 6
2759	B14
2760	J10
2761	A14
2762	A13
2766	N 6
2767	A11
2768	B 4
2770	G21
2772	G21
2778	G19
2780	N 7
2781	K18
2782	K22
2784	J22
2786	I18
2787	M20
2788	I18
2789	M20
2790	I14
2792	H18
2794	F10
2796	F10
2798	G10
2800	I17
2802	I15
2808	D27
2810	N11
2812	N11
2816	A12
2821	I26
2822	E15
2823	I26
2824	E14
2825	I25
2826	E14
2828	B15
2830	B14
2832	C14
2844	B 8
2846	L11
2848	L11
2850	K10
2852	L11
2853	L13
2854	L12
2856	L12
2862	D 4
2863	K16
2864	B 5
2866	C10
2867	J10
2869	J16
2874	G20
2876	C10
2890	H28
2910	E 7
3752	F15
3754	H27
3755	I27
3756	F15
3757	E10
3762	H25
3764	H25
3766	H25
3800	I17
3802	H14
3804	J17
3806	H16
3807	E28
3808	D27
3809	E28
3810	M 6
3812	B 7
3813	B 7
3814	B 8
3816	B 7
3818	B 7
3820	K11
3821	I23
3822	K22
3823	I24
3824	I23
3825	I24
3826	L23
3830	K 9
3831	C21
3832	C21
3833	C21
3834	C 8
3835	C27
3836	D 8
3838	D 8
3840	M 5
3842	N 6
3844	C 4
3846	E 4
3848	E 4
3850	D 6
3852	C 6
3858	I15
3859	J15
3860	J 4
3861	J 9
3862	I 4
3863	K15
3864	I15
3865	J 9
3867	K 9
3868	J 9
3869	J16
3870	L19
3871	H 9
3872	L19
3873	J16
3874	G20
3875	H 8
3876	B10
3877	B 9
3878	B 9
3879	L20
3880	C 9
3882	F25
3884	F26
3886	F27
3890	I28
3891	H28
3894	H28
3906	L 5
3908	B 4
3910	D 7
3912	D 9
3914	K14
3916	K14
3918	K14
3920	K14
3999	J 1
4609	L22
4700	M21
4701	M21
4726	L22
4768	E26
5754	I22
5756	J22
5757	K18
5760	A14
5762	A14
5920	E 7
6750	N 6
6813	B 7
6814	A 7
7750	A10
7751	L13
7762	H25
7764	H26
7766	H27
7788	G19
7800	H17
7808	E28
7810	L 6
7828	L23
7833	C20
7858	I15
7860	H 5
7864	I16
7877	D 9
9420	L 6
9421	M 7
9625	E27
9626	E27
9629	E26
9632	G27
9633	G27
9634	G27
P51	F 2
P52	H29
P53	B29
P53	G29
P54	C29
P60	F 6

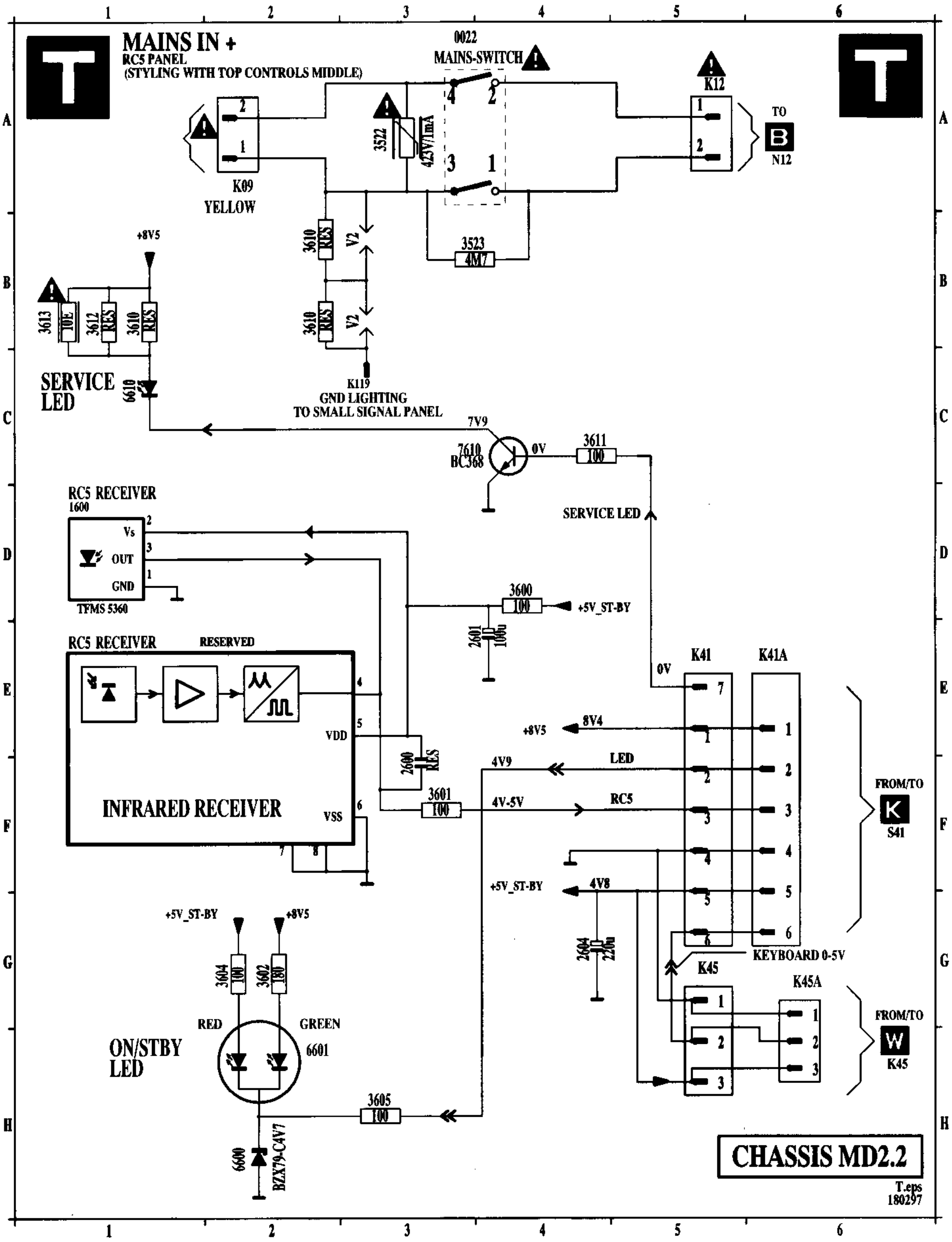
PIP interface panel / PIP-Schnittstellenplatine / Platine interface PIP (image incrustée)


3401 B2
3402 B3
7401 A3
Q51 B2
Q51A B6
Q52 E2
Q52A E6
Q53 G2
Q53A G6
R
8V4
7401
BC848b
Y/CVBS-PIP
Q51
3401
220
3402
180
Q51A
1V5
C/CVBS-PIP
(NOT USED IN 2FH)
GND PIP
SC-IFH/HA
NC
+5V2
8V5
VT
SCL-S
SDA-S
5V
8V4
28V
4V7
FROM/TO
K
S51
(SSP)
S
P51
(PIP)
Q52
Q52A
PIP = 0V2
$\overline{\text{PIP}}$ = 0V
TXT-KILL
GND
HDISP
VD
0V7
0V3
S52
(SSP)
P52
(PIP)
Q53
Q53A
R-EXTIFH
R-PIP
G-EXTIFH
G-PIP
B-EXTIFH
B-PIP
GND-PIP
FBL-EXTIFH
FBL-PIP
RGB-SCART-KILL
0V8
S53
(SSP)
P53
(PIP)
CHASSIS MD2.2
R.eps
140297


3401 A 3
3402 A 2
7401 A 3
Q51 A 3
Q51A A 3
Q52 A 2
Q52A A 2
Q53 A 1
Q53A A 1
3
2
1
A
Q51A
Q52A
Q53A
3402
3401
7401
Q51
Q52
Q53

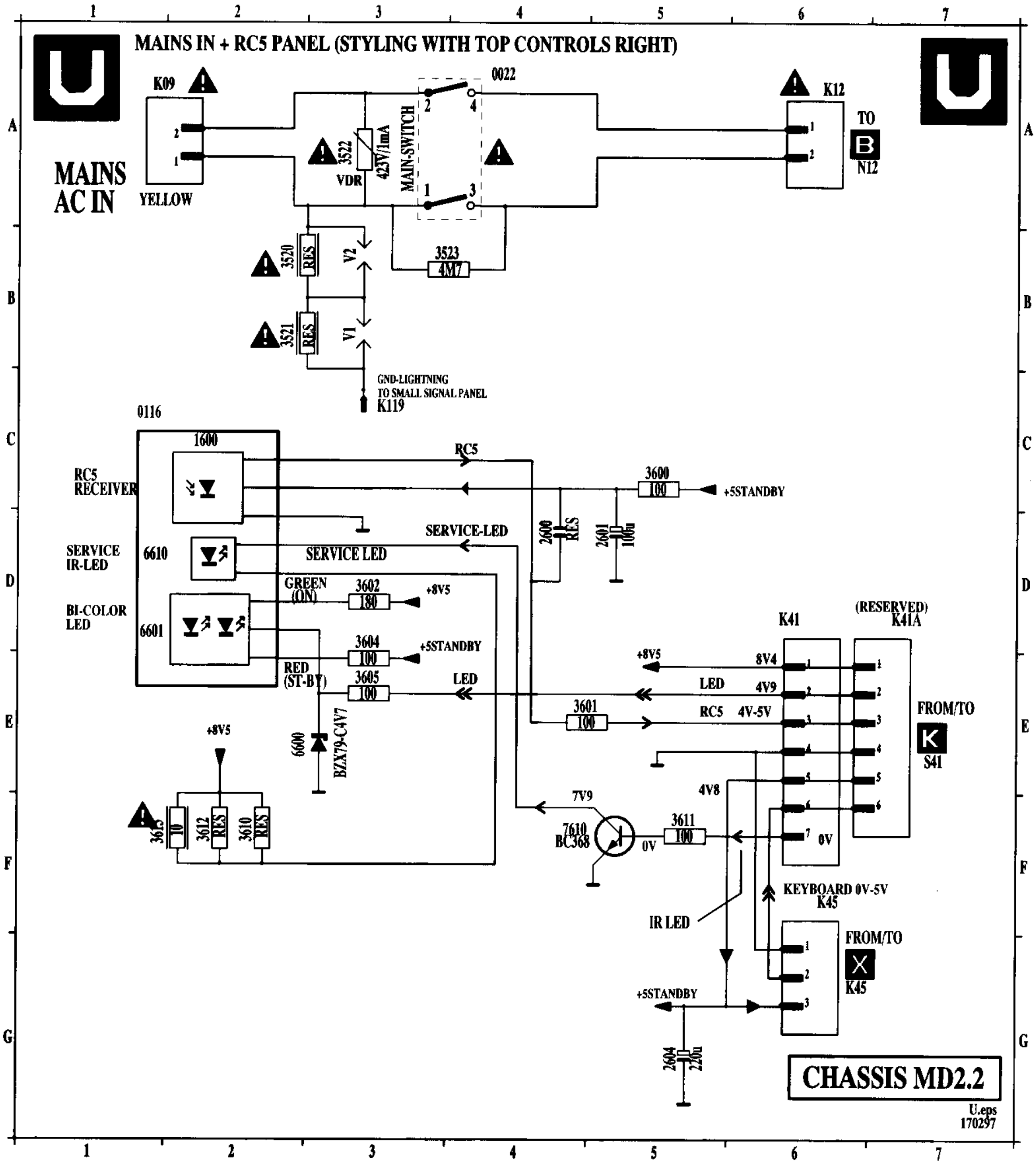
Mains input & RC5 panel (top control middle styling) / Netzeingang- & RC5-Platine (Bedienung mitte oben) / Platine entrée secteur & RC5 (style commande sur le haut, millieu)

0022	A 3	2604	G 4	3601	F 3	3610	B 2	3612	B 1	6610	C 1	K12	A 5	K45A	G 6
1600	D 1	3522	A 3	3602	G 2	3610	B 2	3613	B 1	7610	C 4	K41	E 5	V2	B 3
2600	F 3	3523	B 4	3604	G 2	3610	B 1	6600	H 2	K09	A 2	K41A	E 6	V2	B 3
2601	E 4	3600	D 4	3605	H 3	3611	C 4	6601	H 2	K119	C 3	K45	G 5		

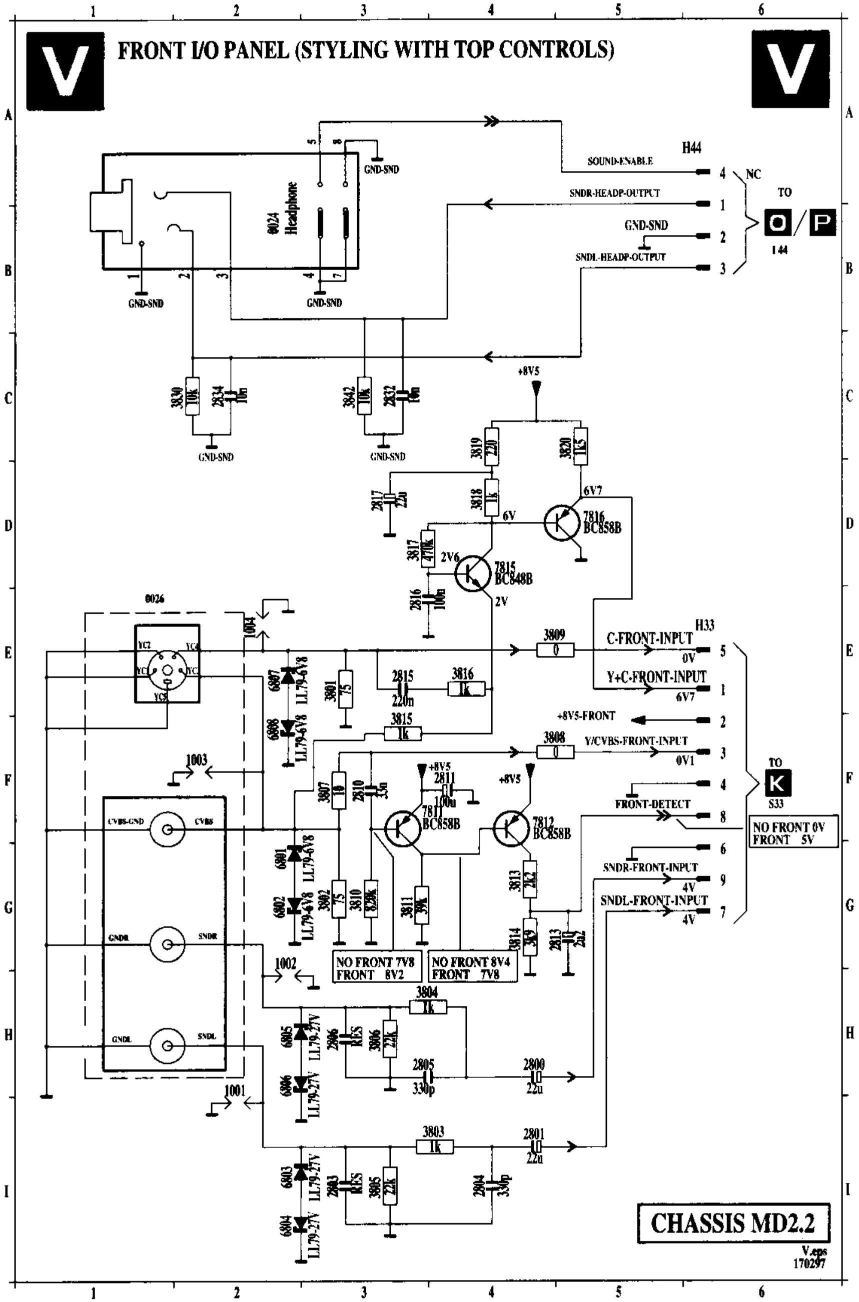

1
2
3
4
5
6
A
B
C
D
E
F
G
H
T
MAINS IN +
RC5 PANEL
(STYLING WITH TOP CONTROLS MIDDLE)
0022
MAINS-SWITCH
K12
TO
B
N12
K09
YELLOW
3522
423V/1mA
3523
4M7
+8V5
3613
10E
3612
RES
3610
RES
V2
K119
GND LIGHTING
TO SMALL SIGNAL PANEL
SERVICE
LED
6610
7V9
7610
BC368
0V
3611
100
SERVICE LED
RC5 RECEIVER
1600
Vs
OUT
GND
TFMS 5360
3600
100
+5V_ST-BY
2601
100u
RC5 RECEIVER
RESERVED
VDD
VSS
INFRARED RECEIVER
2600
RES
3601
100
K41
K41A
+8V5
8V4
LED
4V9
4V-5V
RC5
+5V_ST-BY
4V8
2604
220u
KEYBOARD 0-5V
FROM/TO
K
S41
K45
K45A
FROM/TO
W
K45
+5V_ST-BY
+8V5
3604
100
3602
180
RED
GREEN
6601
ON/STBY
LED
3605
100
6600
BZX79-C4V7
CHASSIS MD2.2
T.eps
180297

Mains input & RC5 panel (top control right styling) / Netzeingang- & RC5-Platine (Bedienung rechts oben) / Platine entrée secteur & RC5 (style commande sur le haut, droite)

0022	A 4	2601	D 5	3521	B 2	3600	C 5	3604	D 3	3611	F 5	6600	E 2	K119	C 3	K41A	D 7	V2	B 3
0116	C 1	2604	G 5	3522	A 3	3601	E 5	3605	E 3	3612	F 2	7610	F 5	K12	A 6	K45	F 6		
2600	D 4	3520	B 2	3523	B 4	3602	D 3	3610	F 2	3613	F 1	K09	A 1	K41	D 6	V1	B 3		

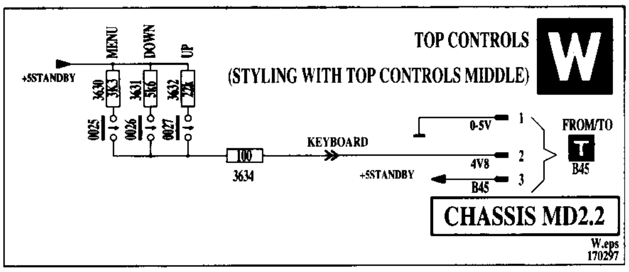

1
2
3
4
5
6
7
A
B
C
D
E
F
G
MAINS IN + RC5 PANEL (STYLING WITH TOP CONTROLS RIGHT)
K09
MAINS
AC IN
YELLOW
3522
VDR
423V/1mA
MAIN-SWITCH
0022
K12
TO
B
N12
3520
RES
V2
3523
4M7
3521
RES
V1
GND-LIGHTNING
TO SMALL SIGNAL PANEL
K119
0116
1600
RC5
RECEIVER
RC5
3600
100
+5STANDBY
SERVICE IR-LED
6610
SERVICE LED
SERVICE-LED
2600
RES
2601
100u
BI-COLOR LED
6601
GREEN (ON)
3602
180
+8V5
3604
100
+5STANDBY
RED (ST-BY)
3605
100
LED
6600
BZX79-C4V7
+8V5
3613
10
3612
RES
3610
RES
K41
(RESERVED)
K41A
+8V5
8V4
LED
4V9
3601
100
RC5
4V-5V
FROM/TO
K
S41
4V8
7V9
7610
BC368
0V
3611
100
0V
IR LED
KEYBOARD 0V-5V
K45
FROM/TO
X
K45
+5STANDBY
2604
220u
CHASSIS MD2.2
U.eps
170297

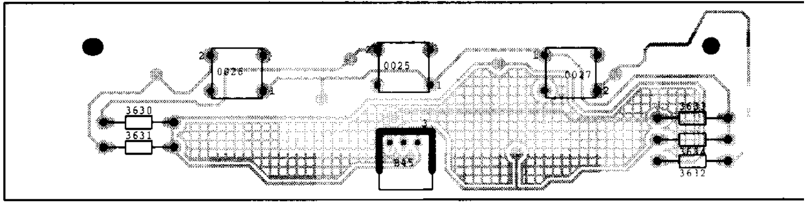
Front input/output panel (top control styling) / Front-Ein-/Ausgangsplatine (Bedienung oben) / Platine frontale entrée/sortie (style commande sur le haut)

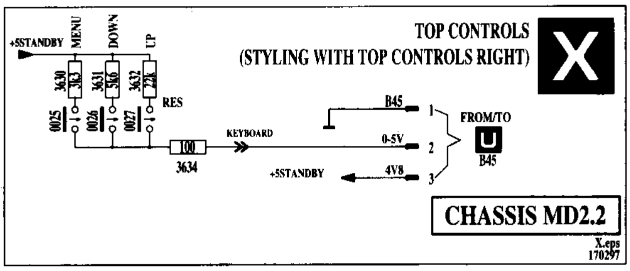

V
FRONT I/O PANEL (STYLING WITH TOP CONTROLS)
V
0024 Headphone
GND-SND
SOUND-ENABLE
H44
4 NC
SNDR-HEADP-OUTPUT
1
TO
GND-SND
2
O/P
SNDL-HEADP-OUTPUT
3
144
3830 10K
2834 10n
3842 10K
2832 10n
+8V5
3819 220
3820 1K5
2817 22u
3818 1k
6V
6V7
7816 BC858B
3817 470K
2V6
7815 BC848B
2816 100n
2V
0026
1004
YC2
YC1
YC3
6807 LL79-6V8
6808 LL79-6V8
3801 75
2815 220n
3816 1k
3815 1k
3809 0
C-FRONT-INPUT
0V
H33
5
Y+C-FRONT-INPUT
6V7
1
+8V5-FRONT
2
3808 0
Y/CVBS-FRONT-INPUT
0V1
3
TO
K
S33
4
FRONT-DETECT
8
NO FRONT 0V FRONT 5V
6
SNDR-FRONT-INPUT
4V
9
SNDL-FRONT-INPUT
4V
7
1003
3807 10
2810 330
2811 100u
7811 BC858B
7812 BC858B
+8V5
CVBS-GND
CVBS
6801 LL79-6V8
6802 LL79-6V8
3802 75
3810 8K2
3811 39K
3813 2K2
3814 3K9
2813 2n2
NO FRONT 7V8 FRONT 8V2
NO FRONT 8V4 FRONT 7V8
GNDR
SNDR
1002
3804 1k
6805 LL79-27V
2806 RES
3806 22K
2805 330p
2800 22u
GNDL
SNDL
1001
6806 LL79-27V
3803 1k
2801 22u
6803 LL79-27V
2803 RES
3805 22K
2804 330p
6804 LL79-27V
CHASSIS MD2.2
V.eps 170297
1 2 3 4 5 6
A B C D E F G H I

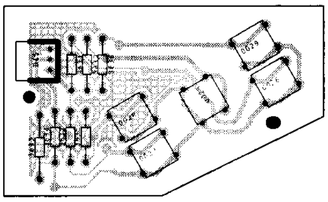
0024	B 2
0026	E 1
1001	H 2
1002	G 2
1003	F 2
1004	E 2
2800	H 4
2801	I 4
2803	I 3
2804	I 4
2805	H 3
2806	H 3
2810	F 3
2811	F 4
2813	G 5
2815	E 3
2816	E 3
2817	D 3
2832	C 3
2834	C 2
3801	E 3
3802	G 3
3803	I 4
3804	H 4
3805	I 3
3806	H 3
3807	F 3
3808	F 5
3809	E 5
3810	G 3
3811	G 3
3813	G 4
3814	G 4
3815	F 3
3816	E 4
3817	D 3
3818	D 4
3819	C 4
3820	C 5
3830	C 2
3842	C 3
6801	G 2
6802	G 2
6803	I 2
6804	I 2
6805	H 2
6806	H 2
6807	E 2
6808	F 2
7811	F 3
7812	F 4
7815	D 4
7816	D 5
H33	E 6
H44	A 5

Top control panel / Obere bedienungsplatine / Platine supérieure de commande


TOP CONTROLS
(STYLING WITH TOP CONTROLS MIDDLE)
W
+5STANDBY
MENU
DOWN
UP
3630
3K3
3631
3K6
3632
22K
0025
0026
0027
100
3634
KEYBOARD
0-5V
4V8
+5STANDBY
B45
1
2
3
FROM/TO
T
B45
CHASSIS MD2.2
W.eps
170297

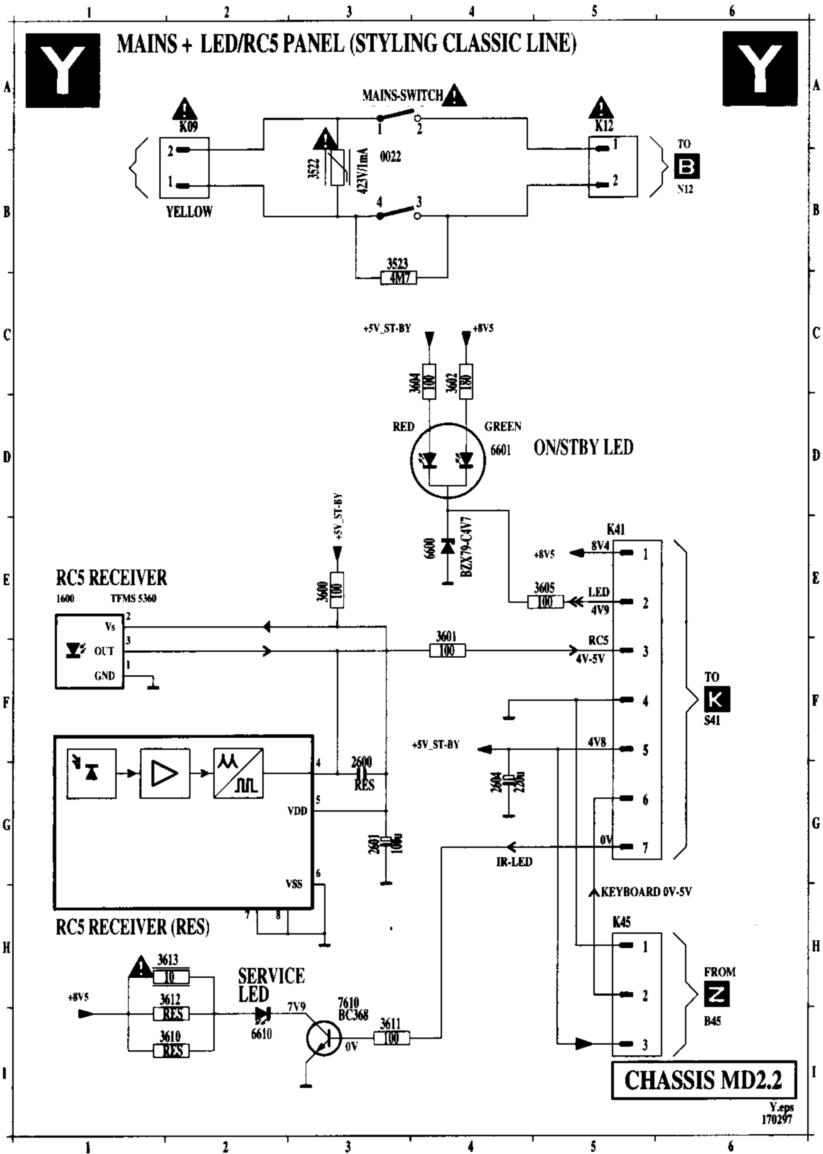

0026
0025
0027
3630
3631
3633
3612
B45


TOP CONTROLS
(STYLING WITH TOP CONTROLS RIGHT)
X
+5STANDBY
MENU
DOWN
UP
3630
3K3
3631
3K6
3632
22K
RES
0025
0026
0027
100
3634
KEYBOARD
B45
0-5V
4V8
+5STANDBY
1
2
3
FROM/TO
U
B45
CHASSIS MD2.2
X.eps
170297

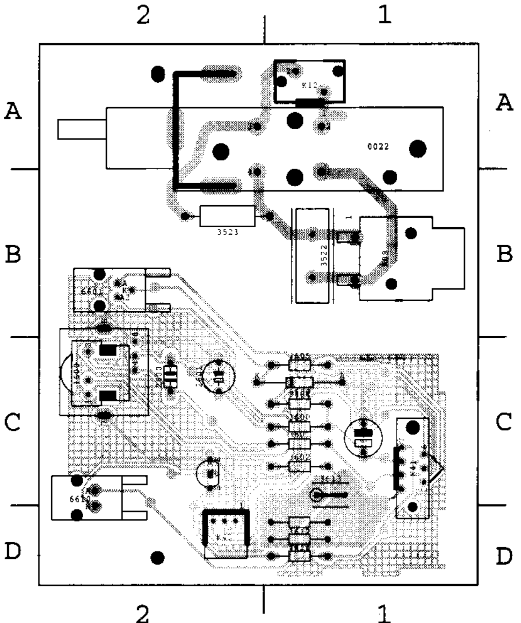


Mains input panel (classic line styling) / Netzeingangsplatine (herkömmliche Bedienung) / Platine entrée secteur (style ligne classique)

0022	B 3	2601	G 3	3523	B 3	3602	C 4	3610	I 2	3613	H 2	6610	I 2	K12	A 5
1600	E 1	2604	G 4	3600	E 3	3604	C 4	3611	I 3	6600	E 4	7610	H 3	K41	E 5
2600	G 3	3522	B 3	3601	F 4	3605	E 5	3612	H 2	6601	D 4	K09	A 2	K45	H 5

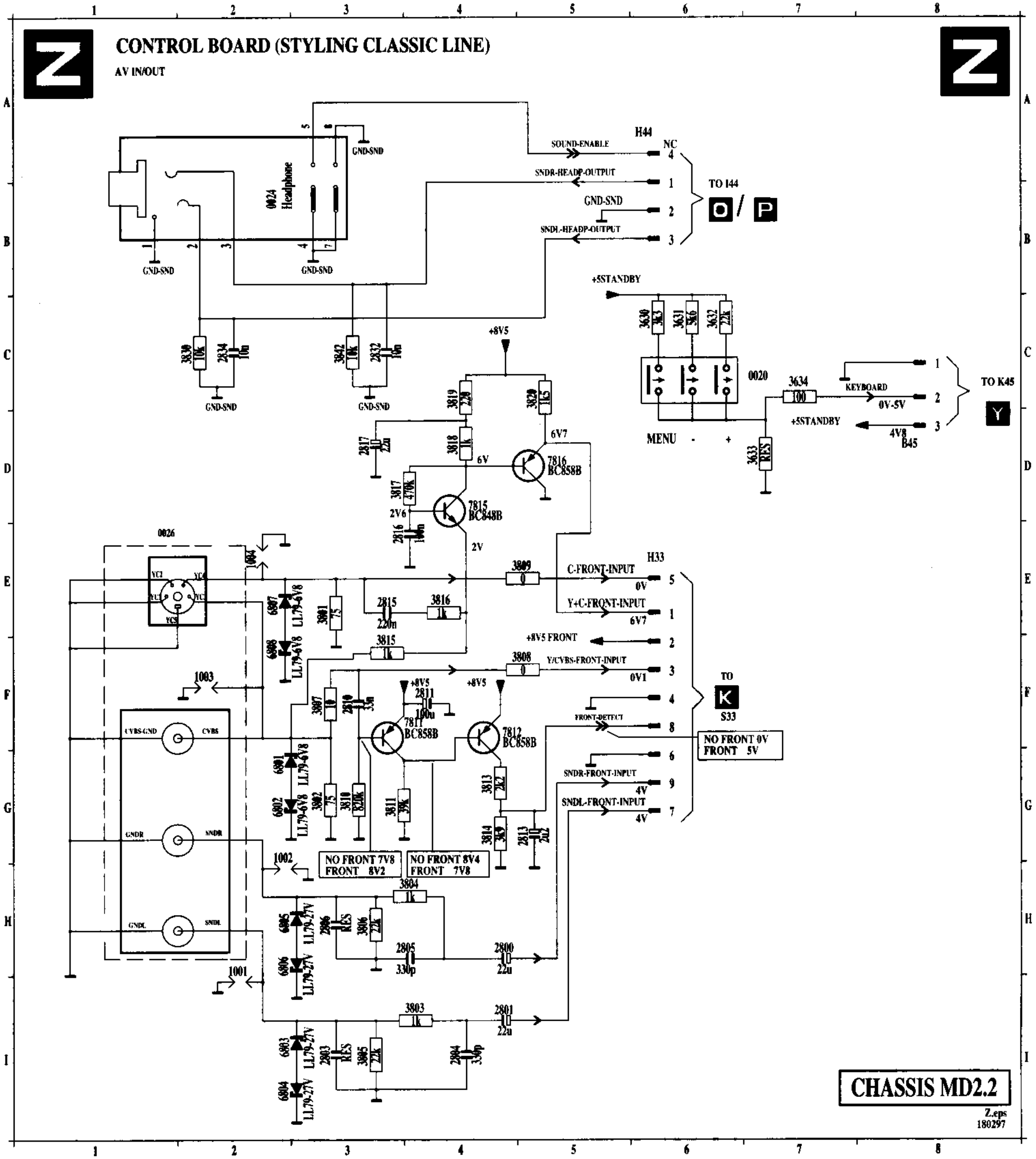

MAINS + LED/RC5 PANEL (STYLING CLASSIC LINE)
Y
Y
MAINS-SWITCH
K09
YELLOW
3522
423V/1mA
0022
3523
4M7
K12
TO
B
N12
+5V_ST-BY
+8V5
3604
100
3602
180
RED
GREEN
6601
ON/STBY LED
6600
BZX79-C4V7
RC5 RECEIVER
1600
TFMS 5360
Vs
OUT
GND
+5V_ST-BY
3600
100
3601
100
K41
+8V5
8V4
3605
100
LED
4V9
RC5
4V-5V
4V8
+5V_ST-BY
2604
10µ
25V
0V
IR-LED
TO
K
S41
2600
RES
2601
100µ
VDD
VSS
RC5 RECEIVER (RES)
KEYBOARD 0V-5V
K45
FROM
Z
B45
3613
10
3612
RES
3610
RES
+8V5
SERVICE LED
6610
7V9
7610
BC368
0V
3611
100
CHASSIS MD2.2
Y.eps
170297
1
2
3
4
5
6
A
B
C
D
E
F
G
H
I

0022	B 1	3522	B 1	3604	C 1	3613	C 1	K09	B 1
1600	C 2	3523	B 1	3605	C 1	6600	C 1	K12	A 1
2600	C 2	3600	C 1	3610	D 1	6601	B 2	K41	C 1
2601	C 2	3601	C 1	3611	D 1	6610	C 2	K45	D 2
2604	C 1	3602	C 1	3612	D 1	7610	C 2		


2
1
A
B
C
D
K12
0022
3523
3522
2
1

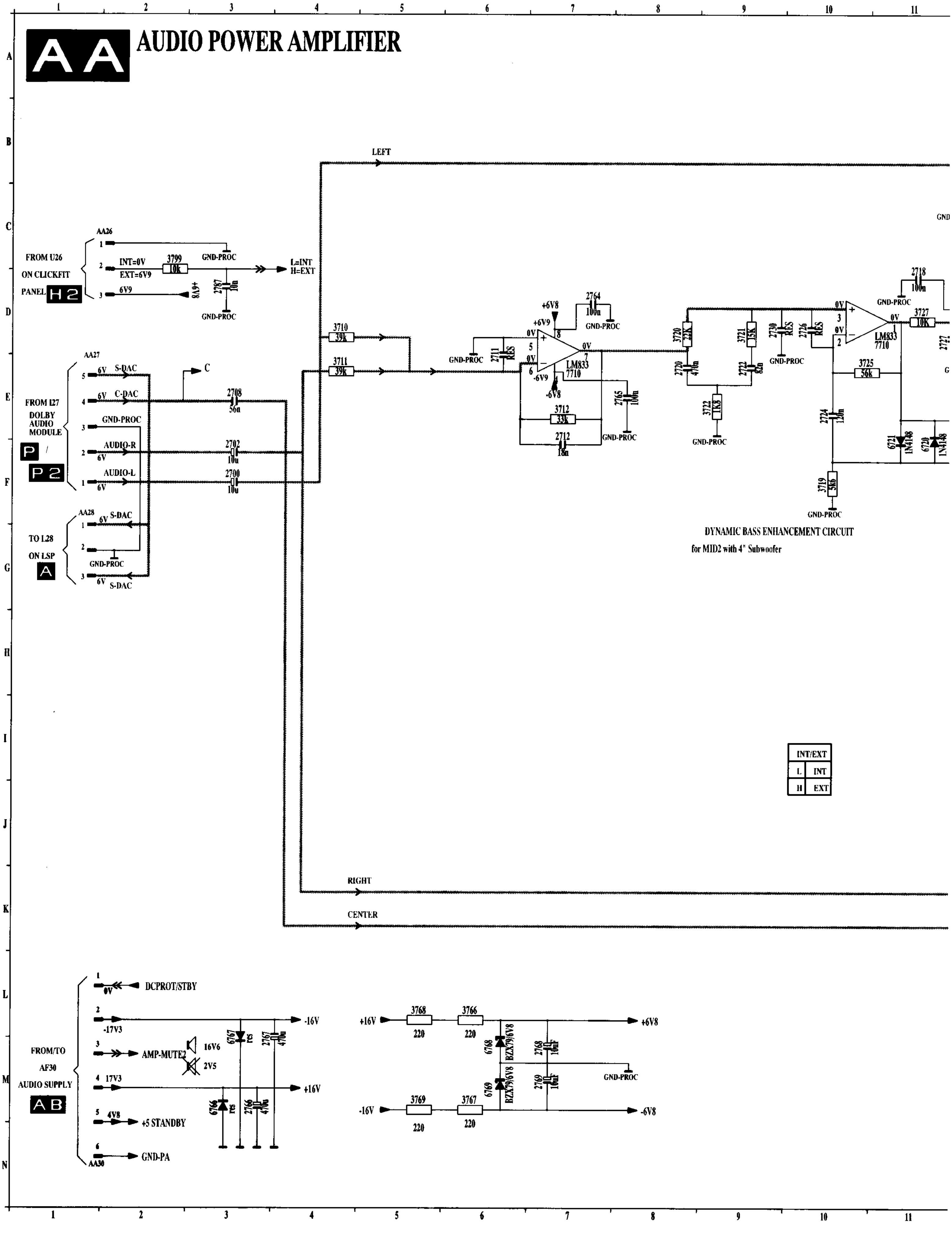
Control board (classic line styling) / Steuerplatine (herkömmliche Bedienung) / Tableau de commande (style ligne classique)

0020	C 7
0024	B 2
0026	E 1
1001	H 2
1002	G 2
1003	F 2
1004	E 2
2800	H 4
2801	I 4
2803	I 3
2804	I 4
2805	H 4
2806	H 3
2810	F 3
2811	F 4
2813	G 5
2815	E 3
2816	E 3
2817	D 3
2832	C 3
2834	C 2
3630	C 6
3631	C 6
3632	C 6
3633	D 7
3634	C 7
3801	E 3
3802	G 3
3803	I 4
3804	H 4
3805	I 3
3806	H 3
3807	F 3
3808	F 5
3809	E 5
3810	G 3
3811	G 3
3813	G 4
3814	G 4
3815	F 3
3816	E 4
3817	D 3
3818	D 4
3819	C 4
3820	C 5
3830	C 2
3842	C 3
6801	G 2
6802	G 2
6803	I 2
6804	I 2
6805	H 2
6806	H 2
6807	E 2
6808	F 2
7811	F 3
7812	F 4
7815	D 4
7816	D 5
B45	D 8
H33	E 6
H44	A 6

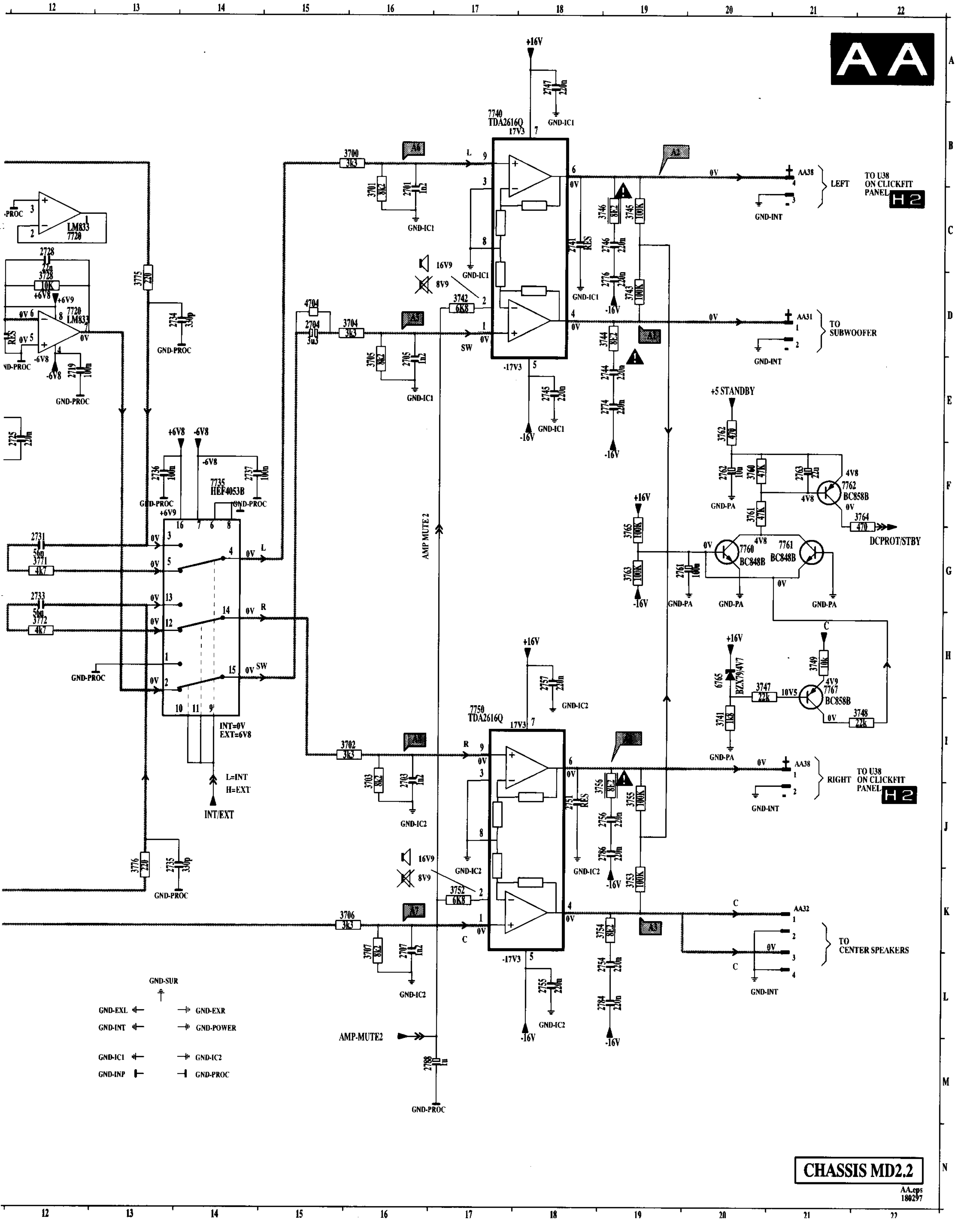

CONTROL BOARD (STYLING CLASSIC LINE)
AV IN/OUT
Z
0024 Headphone
GND-SND
SOUND-ENABLE
SNDR-HEADP-OUTPUT
SNDL-HEADP-OUTPUT
H44
NC
TO I44
O / P
+5STANDBY
3630 3K3
3631 5K6
3632 22K
0020
MENU - +
3634 100
KEYBOARD
0V-5V
4V8
B45
3633 RES
TO K45
Y
+8V5
3830 10K
2834 10n
3842 10K
2832 10n
3819 220
3820 1K5
3818 1k
2817 22u
3817 470K
7815 BC848B
7816 BC858B
2816 100n
6V
6V7
2V6
2V
0026
1004
1003
1002
1001
6807 LL79-6V8
6808 LL79-6V8
3801 75
2815 220n
3816 1k
3815 1k
3809 0
3808 0
H33
C-FRONT-INPUT
0V
Y+C-FRONT-INPUT
6V7
+8V5 FRONT
Y/CVBS-FRONT-INPUT
0V1
TO
K
S33
FRONT-DETECT
NO FRONT 0V
FRONT 5V
SNDR-FRONT-INPUT
SNDL-FRONT-INPUT
4V
CVBS-GND
CVBS
GNDR
SNDR
GNDL
SNDL
3807 10
2810 33n
2811 100u
7811 BC858B
7812 BC858B
3813 2K2
3814 3K9
2813 2u2
6801 LL79-6V8
6802 LL79-6V8
3802 75
3810 820K
3811 39K
NO FRONT 7V8
FRONT 8V2
NO FRONT 8V4
FRONT 7V8
3804 1k
6805 LL79-27V
6806 LL79-27V
2806 RES
3806 22K
2805 330p
2800 22u
3803 1k
2801 22u
6803 LL79-27V
6804 LL79-27V
2803 RES
3805 22K
2804 330p
CHASSIS MD2.2
Z.eps
180297
A B C D E F G H I
1 2 3 4 5 6 7 8

2700	F 3
2701	C16
2702	F 3
2703	I16
2704	D15
2705	E16
2707	K16
2708	E 3
2711	D 6
2712	E 7
2718	D11
2719	E12
2720	E 8
2722	E 9
2724	E10
2725	E12
2726	D10
2727	D11
2728	C12
2730	D 9
2731	G12
2733	G12
2734	D13
2735	J13
2736	F13
2737	F14
2741	C18
2744	E19
2745	E18
2746	C19
2747	A18
2751	J18
2754	L19
2755	L18
2756	J19
2757	H18
2761	G19
2762	F20
2763	F21
2764	D 7
2765	E 8
2766	M 3
2767	L 3
2768	M 7
2769	M 7
2774	E19
2776	D19
2784	L19
2786	J19
2787	D 3
2788	M17
3700	B16
3701	C16
3702	I16
3703	I16
3704	D16
3705	E16
3706	K16
3707	K16
3710	D 4
3711	E 4
3712	E 7
3719	F10
3720	D 8
3721	
3722	
3725	
3727	

AA AUDIO POWER AMPLIFIER


1
2
3
4
5
6
7
8
9
10
11
A
B
C
D
E
F
G
H
I
J
K
L
M
N
LEFT
RIGHT
CENTER
GND
AA26
FROM U26
ON CLICKFIT
PANEL H2
INT=0V
EXT=6V9
3799
10k
GND-PROC
L=INT
H=EXT
6V9
8A9+
2787
10n
3710
39k
3711
39k
AA27
FROM L27
DOLBY
AUDIO
MODULE
P / P2
S-DAC
C-DAC
GND-PROC
AUDIO-R
AUDIO-L
6V
C
2708
56n
2702
10u
2700
10u
AA28
TO L28
ON LSP
A
S-DAC
GND-PROC
+6V8
+6V9
-6V9
-6V8
0V
2711
RES
2764
100n
LM833
7710
3712
33k
2712
18n
2765
100n
3720
22K
3721
15K
2730
RES
2726
RES
2720
470n
2722
82n
3722
1K8
2718
100n
3727
10K
3725
56k
2724
120n
6721
1N4148
6720
1N4148
3719
5k6
2727
DYNAMIC BASS ENHANCEMENT CIRCUIT
for MID2 with 4" Subwoofer
INT/EXT
L INT
H EXT
DCPROT/STBY
-17V3
-16V
AMP-MUTE2
16V6
2V5
17V3
+16V
4V8
+5 STANDBY
GND-PA
AA30
FROM/TO
AF30
AUDIO SUPPLY
AB
6767
6766
2767
470u
2766
470u
3768
220
3766
220
3769
220
3767
220
+6V8
-6V8
6768
BZX79/6V8
6769
BZX79/6V8
2768
10uF
2769
10uF

	D 9
	D11
3728	D12
3741	I20
3742	D17
3743	D19
3744	D19
3745	C19
3746	C19
3747	H20
3748	I22
3749	H21
3752	K17
3753	K19
3754	K19
3755	J19
3756	J19
3760	F20
3761	F20
3762	E20
3763	G19
3764	F22
3765	G19
3766	L 6
3767	M 6
3768	L 5
3769	M 5
3771	G12
3772	H12
3775	D13
3776	J13
3799	C 2
3999	L10
4704	D15
6720	F11
6721	E11
6765	H20
6766	M 3
6767	L 3
6768	M 6
6769	M 6
7710	E 7
7710	D11
7720	D12
7720	C12
7735	F14
7740	B17
7750	I17
7760	G20
7761	G21
7762	F21
7767	H21
AA26	C 2
AA27	E 1
AA28	F 1
AA30	N 2
AA31	D21
AA32	K21
AA38	I21
AA38	B21
audi	E17
uadi	L17

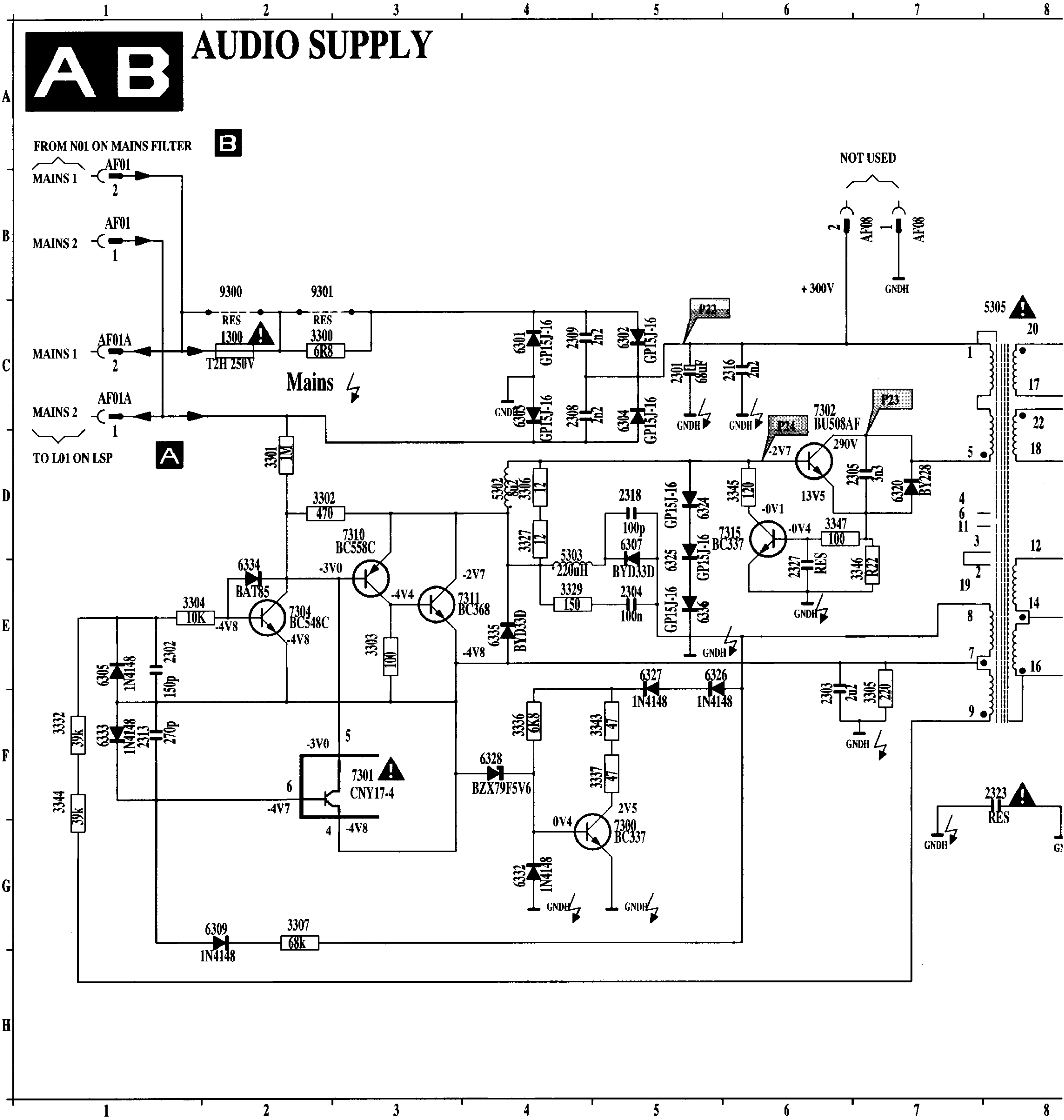

AA
+16V
2747 220n
GND-IC1
7740 TDA2616Q
17V3 7
3700 3k3
L 9
6
0V
3701 8K2
2701 1n2
3746 8E2
3745 100K
0V
AA38
LEFT
TO U38 ON CLICKFIT PANEL
H2
GND-INT
LM833 7720
2728 22n
3728 10K
+6V8
+6V9
0V 6
7720 LM833
RES
-6V8
2719 100n
GND-PROC
3775 220
2734 330p
2741 RES
2746 220n
2776 220n
3743 100K
-16V
16V9
8V9
3742 6K8
4704
2704 3u3
3704 3k3
SW
3705 8K2
2705 1n2
-17V3 5
2745 220n
3744 8E2
2744 220n
2774 220n
AA31
TO SUBWOOFER
+5 STANDBY
3762 470
2762 10u
3760 47K
2763 22u
4V8
7762 BC858B
3761 47K
3764 470
DCPROT/STBY
+16V
3765 100K
3763 100K
2761 10u
7760 BC848B
7761 BC848B
GND-PA
2725 220n
+6V8 -6V8
2736 100n
2737 100n
7735 HEF4053B
2731 56n
3771 4K7
2733 56n
3772 4K7
INT=0V EXT=6V8
L=INT H=EXT
INT/EXT
AMP MUTE 2
R
C
6765 BZX79/4V7
3749 10k
3747 22k
10V5
4V9
7767 BC858B
3748 22k
3741 1k8
7750 TDA2616Q
2757 220n
GND-IC2
3702 3k3
3703 8K2
2703 1n2
2751 RES
3756 8E2
3755 100K
2756 220n
2786 220n
3753 100K
RIGHT
3776 220
2735 330p
3752 6K8
3706 3k3
3707 8K2
2707 1n2
2755 220n
3754 8E2
2754 220n
2784 220n
AA32
TO CENTER SPEAKERS
GND-SUR
GND-EXL
GND-EXR
GND-INT
GND-POWER
GND-IC1
GND-IC2
GND-INP
GND-PROC
AMP-MUTE2
2788 1u
12 13 14 15 16 17 18 19 20 21 22
A B C D E F G H I J K L M N

CHASSIS MD2.2

AA.eps
180297

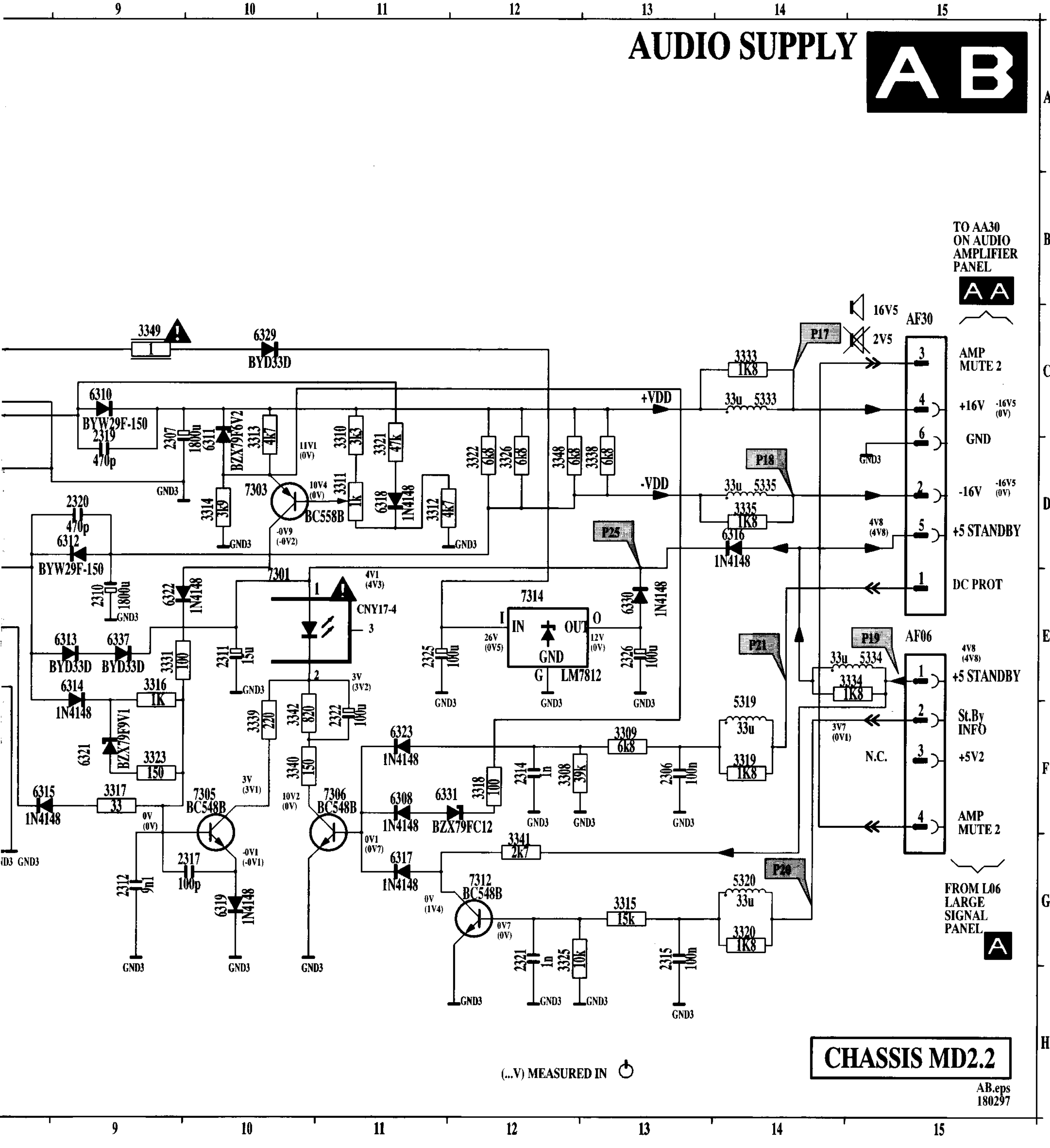
Audio supply panel / Ton-Speiseplatine /

1300	C 2
2301	C 5
2302	E 1
2303	F 6
2304	E 5
2305	D 7
2306	F13
2307	C 9
2308	C 4
2309	C 4
2310	E 9
2311	E10
2312	G 9
2313	F 1
2314	F12
2315	G13
2316	C 6
2317	G10
2318	D 5
2319	D 9
2320	D 9
2321	G12
2322	F11
2323	F 8
2325	E11
2326	E13
2327	E 6
3300	C 2
3301	D 2
3302	D 2
3303	E 3
3304	E 1
3305	F 7
3306	D 4
3307	G 2
3308	F12
3309	F13
3310	C11
3311	D11
3312	D11
3313	C10
3314	D10
3315	G13
3316	E 9
3317	F 9
3318	F12
3319	F14
3320	G14
3321	D11
3322	D12
3323	F 9
3325	G12
3326	D12
3327	D 4
3329	E 4
3331	E 9
3332	F 1
3333	C14
3334	E15
3335	D14
3336	F 4
3337	F 5
3338	D13
3339	F10
3340	F10
3341	G12
3342	F10
3343	F 5
3344	F 1
3345	D 6
3346	E 7
3347	D 6
334	
334	
339	
530	
530	
530	


1
2
3
4
5
6
7
8
A
B
C
D
E
F
G
H
AB
AUDIO SUPPLY
FROM N01 ON MAINS FILTER
B
MAINS 1
AF01
2
MAINS 2
AF01
1
MAINS 1
AF01A
2
MAINS 2
AF01A
1
TO L01 ON LSP
A
9300
RES
1300
T2H 250V
9301
RES
3300
6R8
Mains
NOT USED
2
AF08
1
AF08
GNDH
+300V
P22
5305
20
17
22
18
1
5
4
6
11
3
2
12
19
14
8
16
7
9
6301
GP15J-16
2309
2n2
6302
GP15J-16
GNDH
6303
GP15J-16
2308
2n2
6304
GP15J-16
2301
68uF
2316
2n2
GNDH
GNDH
7302
BU508AF
P23
P24
-2V7
290V
13V5
2305
3n3
6320
BY228
3301
1M
5302
8u2
3306
12
3302
470
2318
100p
6307
BYD33D
6324
GP15J-16
3345
120
-0V1
7315
BC337
-0V4
3347
100
3327
12
5303
220uH
6325
GP15J-16
2327
RES
3346
R22
GNDH
7310
BC558C
-3V0
-2V7
6334
BAT85
3329
150
2304
100n
6336
GP15J-16
-4V4
7311
BC368
3304
10K
-4V8
7304
BC548C
-4V8
6335
BYD33D
GNDH
6305
1N4148
2302
150p
3303
100
-4V8
6327
1N4148
6326
1N4148
2303
2u2
3305
220
3332
39k
6333
1N4148
2313
270p
-3V0
5
3336
6K8
3343
47
GNDH
7301
CNY17-4
6
-4V7
4
-4V8
6328
BZX79F5V6
3337
47
2V5
0V4
7300
BC337
2323
RES
GNDH
3344
39k
6332
1N4148
GNDH
GNDH
6309
1N4148
3307
68k

Platine alimentation audio

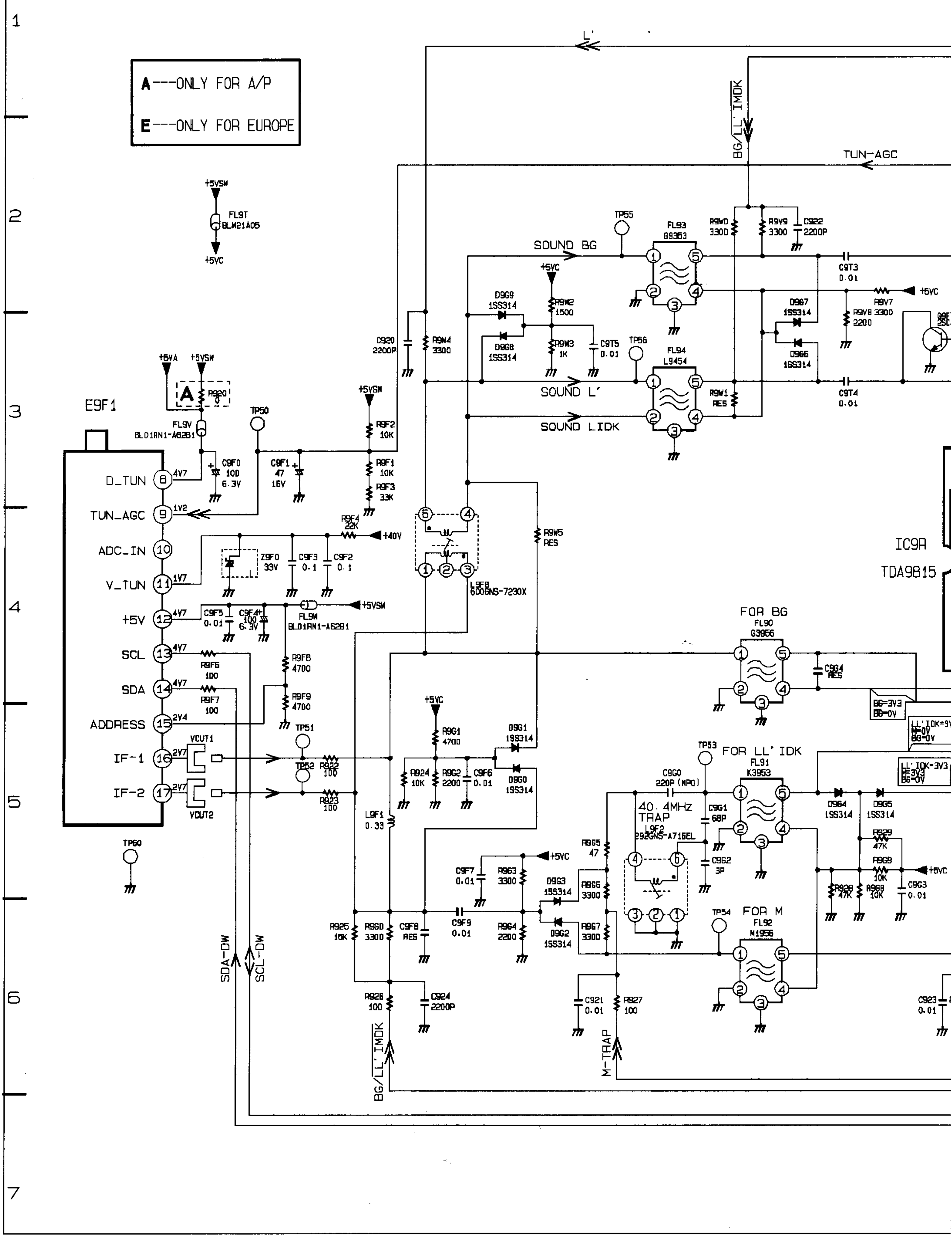
8	D12	5319	F14	6302	C 5	6309	G 2	6315	F 8	6321	F 9	6327	E 5	6333	F 1	7301	F 3	7306	F11	9300	B 2	AF06	E15
9	C 9	5320	G14	6303	C 4	6310	C 9	6316	D14	6322	E 9	6328	F 4	6334	E 2	7301	E10	7310	D 3	9301	B 2	AF08	B 7
8	H 8	5333	C14	6304	C 5	6311	D10	6317	G11	6323	F11	6329	C10	6335	E 4	7302	C 6	7311	E 3	AF01	B 1	AF08	B 7
2	D 4	5334	E15	6305	E 1	6312	D 9	6318	D11	6324	D 5	6330	E13	6336	E 5	7303	D11	7312	G12	AF01	A 1	AF30	C15
3	E 4	5335	D14	6307	D 5	6313	E 9	6319	G10	6325	D 5	6331	F12	6337	E 9	7304	E 2	7314	E12	AF01A	C 1	k1	B 8
5	C 8	6301	C 4	6308	F11	6314	E 9	6320	D 7	6326	E 5	6332	G 4	7300	G 5	7305	F10	7315	D 6	AF01A	C 1	k3	B 7



9
10
11
12
13
14
15
AUDIO SUPPLY
AB
A
B
C
D
E
F
G
H
TO AA30
ON AUDIO
AMPLIFIER
PANEL
AA
16V5
2V5
AF30
P17
3333
1K8
3
AMP
MUTE 2
3349
1
6329
BYD33D
6310
BYW29F-150
2319
470p
2307
1800u
6311
BZX79F6V2
3313
4K7
11V1
(0V)
3310
3K3
3321
47k
+VDD
33u
5333
4
+16V
-16V5
(0V)
6
GND
GND3
3322
6k8
3326
6k8
3348
6k8
3338
6k8
P18
-VDD
5335
2
-16V
-16V5
(0V)
3335
1K8
GND3
3314
3K9
7303
10V4
(0V)
3311
1k
6318
1N4148
3312
4K7
BC558B
-0V9
(-0V2)
2320
470p
6312
BYW29F-150
P25
6316
1N4148
4V8
(4V8)
5
+5 STANDBY
1
DC PROT
2310
1800u
6322
1N4148
7301
4V1
(4V3)
CNY17-4
3
7314
IN
OUT
I
O
GND
G
LM7812
26V
(0V5)
12V
(0V)
6330
1N4148
2325
100u
2326
100u
P21
P19
AF06
33u
5334
3334
1K8
+5 STANDBY
St.By
INFO
3V7
(0V1)
N.C.
+5V2
AMP
MUTE 2
6313
BYD33D
6337
BYD33D
3331
100
2311
15u
6314
1N4148
3316
1K
2
3V
(3V2)
3339
220
3342
820
2322
100u
6321
BZX79F9V1
3323
150
6323
1N4148
3309
6k8
5319
33u
3319
1K8
2314
1n
3308
39k
2306
100n
3318
100
6315
1N4148
3317
33
7305
BC548B
3V
(3V1)
3340
150
10V2
(0V)
7306
BC548B
6308
1N4148
6331
BZX79FC12
0V
(0V)
-0V1
(-0V1)
0V1
(0V7)
3341
2k7
P20
2317
100p
6317
1N4148
2312
9n1
6319
1N4148
7312
BC548B
0V
(1V4)
0V7
(0V)
3315
15k
5320
33u
3320
1K8
FROM L06
LARGE
SIGNAL
PANEL
2321
1n
3325
10k
2315
100n
GND3
CHASSIS MD2.2
(...V) MEASURED IN
AB.eps
180297

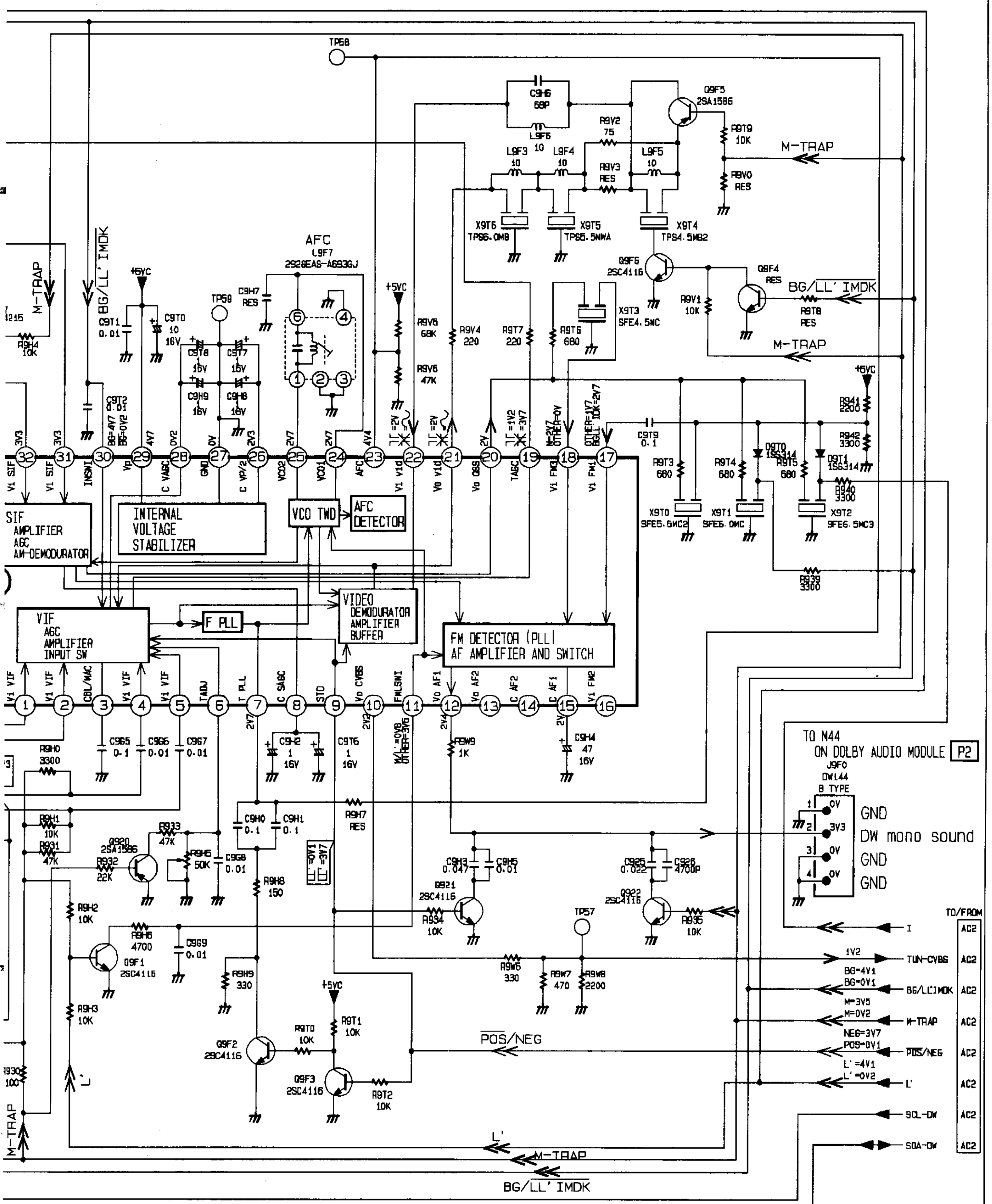
AC1 Double Window

Setting for


A
B
C
D
E
1
2
3
4
5
6
7
A---ONLY FOR A/P
E---ONLY FOR EUROPE
L'
BG/LL' IMDK
TUN-AGC
+5VSW
FL9T
BLM21A05
+5VC
TP55
FL93
G9353
R9WD 3300
R9V9 3300
C922 2200P
SOUND BG
C9T3 0.01
+5VC
R9V7
D9G9 1SS314
R9W2 1500
D9G7 1SS314
R9V8 3300 2200
D9G8 1SS314
R9W3 1K
C9T5 0.01
TP56
D9G6 1SS314
C920 2200P
R9W4 3300
FL94
L9454
SOUND L'
R9W1 RES
C9T4 0.01
SOUND LIDK
+5VA
+5VSW
A
R920 0
E9F1
FL9V
BLD1RN1-A62B1
TP50
+5VSW
R9F2 10K
C9F0 100 6.3V
C9F1 47 16V
R9F1 10K
R9F3 33K
D_TUN
TUN_AGC
ADC_IN
V_TUN
+5V
SCL
SDA
ADDRESS
IF-1
IF-2
8
9
10
11
12
13
14
15
16
17
4V7
1V2
1V7
4V7
4V7
4V7
2V4
2V7
2V7
R9F4 22K
+40V
Z9F0 33V
C9F3 0.1
C9F2 0.1
R9W5 RES
L9F8
600GNS-7230X
IC9A
TDA9815
C9F5 0.01
C9F4 100 6.3V
FL9W
BLD1RN1-A62B1
+5VSW
FOR BG
FL90
G3956
C9G4 RES
R9F6 100
R9F7 100
R9F8 4700
R9F9 4700
BG=3V3
BG=0V
LL' IDK=3V
M=0V
BG=0V
LL' IDK=3V3
M=3V3
BG=0V
+5VC
R9G1 4700
D9G1 1SS314
TP51
VCUT1
VCUT2
TP52
R922 100
R923 100
R924 10K
R9G2 2200
C9F6 0.01
D9G0 1SS314
TP53
FOR LL' IDK
FL91
K3953
C9G0 220P (NPO)
40.4MHz TRAP
L9F2
292GNS-A716EL
C9G1 68P
C9G2 3P
D9G4 1SS314
D9G5 1SS314
R929 47K
R9G9 10K
+5VC
R928 47K
R9G8 10K
C9G3 0.01
L9F1 0.33
TP60
R9G5 47
C9F7 0.01
R9G3 3300
+5VC
D9G3 1SS314
R9G6 3300
R925 15K
R9G0 3300
C9F8 RES
C9F9 0.01
R9G4 2200
D9G2 1SS314
R9G7 3300
TP54
FOR M
FL92
M1956
SDA-DW
SCL-DW
R926 100
C924 2200P
C921 0.01
R927 100
C923 0.01
BG/LL' IMDK
M-TRAP

AC1

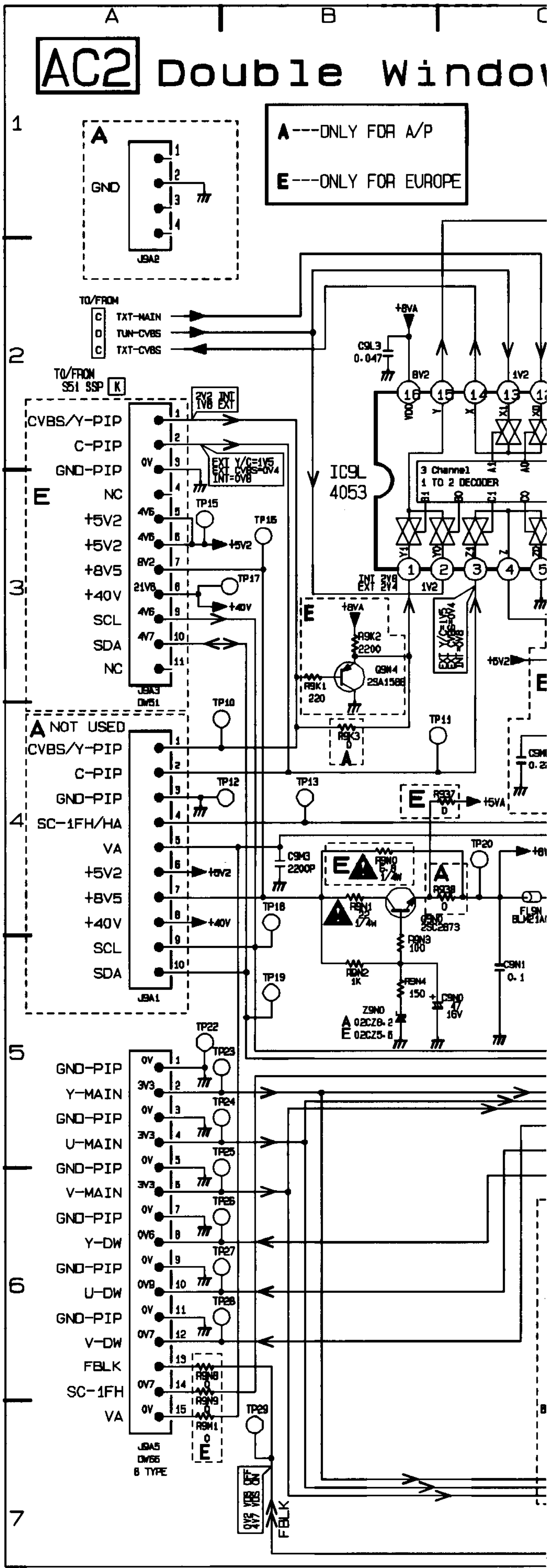
measurments:SDM+VDS picture mode


TP58
C9H6 68P
L9F6 10
Q9F5 2SA1586
R9V2 75
R9T9 10K
M-TRAP
L9F3 10
L9F4 10
L9F5 10
R9V3 RES
R9V0 RES
X9T6 TPS6.0MB
X9T5 TPS5.5MWA
X9T4 TPS4.5MB2
Q9F6 2SC4116
Q9F4 RES
BG/LL' IMDK
R9V1 10K
R9T8 RES
X9T3 SFE4.5MC
AFC
L9F7 2926EAS-A693GJ
+5VC
C9H7 RES
C9T1 0.01
C9T0 10 16V
C9T8 1 16V
C9T7 1 16V
C9H9 1 16V
C9H8 1 16V
C9T2 0.01
R9V5 68K
R9V6 47K
R9V4 220
R9T7 220
R9T6 680
R9H4 10K
C9T9 0.1
R9T3 680
R9T4 680
R9T5 680
D9T0 1SS314
D9T1 1SS314
R941 2200
R942 3300
R940 3300
R939 3300
X9T0 SFE5.5MC2
X9T1 SFE6.0MC
X9T2 SFE6.5MC3
V1 SIF
V1 SIF
INSWI
Vp
C VAGC
GND
C VP/2
VCO2
VCO1
AFC
Vi Vid
Vo Vid
Vo QSS
TAGC
Vi FM3
Vi FM1
SIF AMPLIFIER AGC AM-DEMODURATOR
INTERNAL VOLTAGE STABILIZER
VCO TWD
AFC DETECTOR
VIF AGC AMPLIFIER INPUT SW
F PLL
VIDEO DEMODURATOR AMPLIFIER BUFFER
FM DETECTOR (PLL) AF AMPLIFIER AND SWITCH
Vi VIF
Vi VIF
CBL/MAC
Vi VIF
Vi VIF
TADJ
T PLL
C SAGC
STD
Vo CVBS
FMLSWI
Vo AF1
Vo AF2
C AF2
C AF1
Vi FM2
R9H0 3300
C9G5 0.1
C9G6 0.01
C9G7 0.01
C9H2 1 16V
C9T6 1 16V
C9H4 47 16V
R9W9 1K
R9H1 10K
R931 47K
Q920 2SA1586
R932 22K
R933 47K
R9H5 50K
C9G8 0.01
C9H0 0.1
C9H1 0.1
R9H7 RES
R9H8 150
C9H3 0.047
C9H5 0.01
Q921 2SC4116
R934 10K
C926 0.022
C928 4700P
Q922 2SC4116
R935 10K
TP57
R9H2 10K
R9H6 4700
C9G9 0.01
Q9F1 2SC4116
R9W6 330
R9W7 470
R9W8 2200
R9H9 330
R9H3 10K
+5VC
R9T1 10K
R9T0 10K
Q9F2 2SC4116
Q9F3 2SC4116
R9T2 10K
POS/NEG
R930 100
L'
M-TRAP
BG/LL' IMDK
TO N44 ON DOLBY AUDIO MODULE P2
J9F0 DW144 8 TYPE
0V GND
3V3 DW mono sound
0V GND
0V GND
TO/FROM
I AC2
1V2 TUN-CVBS AC2
BG=4V1 BG=0V1 BG/LL'IMDK AC2
M=3V5 M=0V2 M-TRAP AC2
NEG=3V7 POS=0V1 POS/NEG AC2
L'=4V1 L'=0V2 L' AC2
SCL-DW AC2
SDA-DW AC2

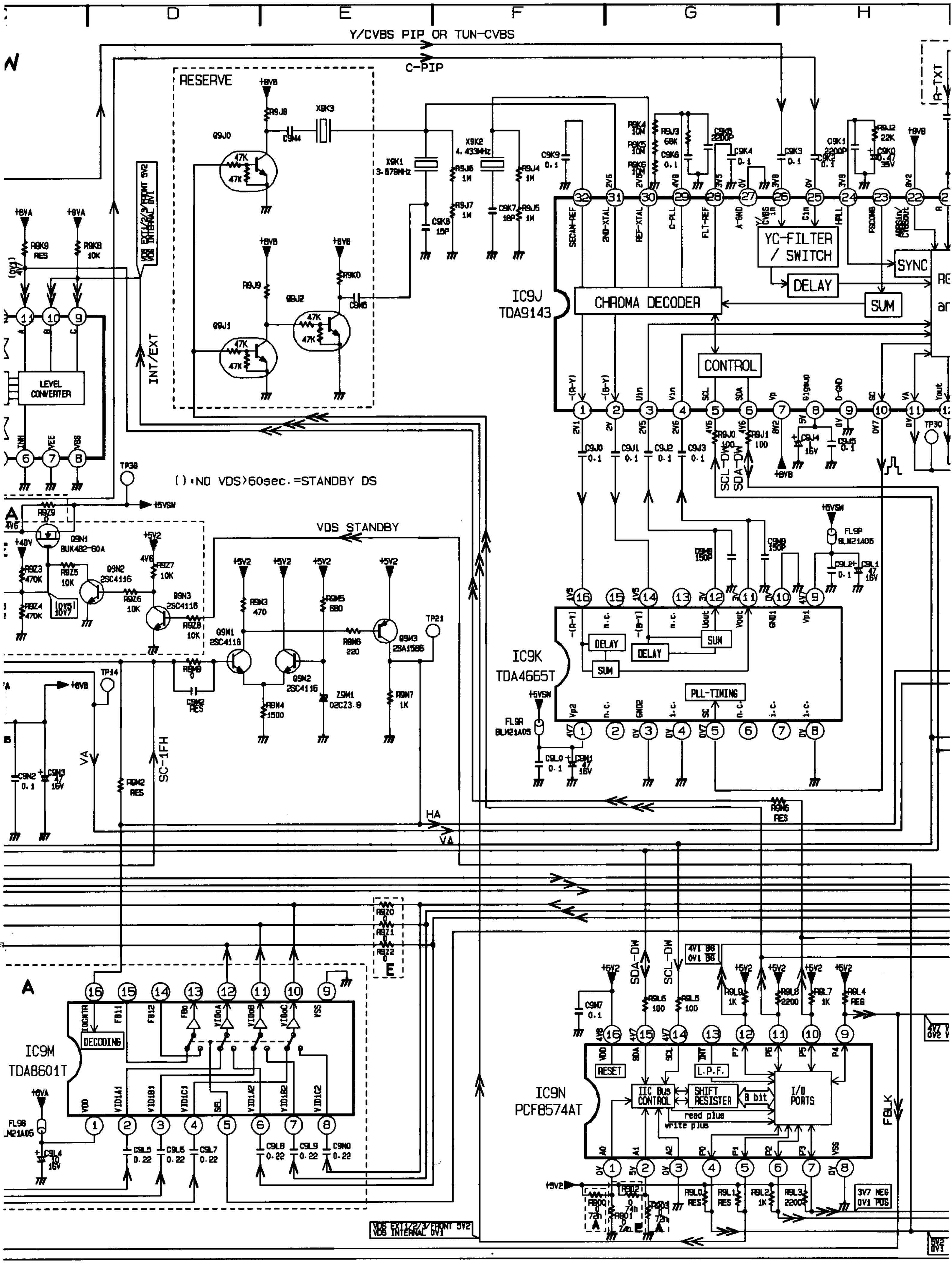
CHASSIS MD2.2

AC1.EPS
120397

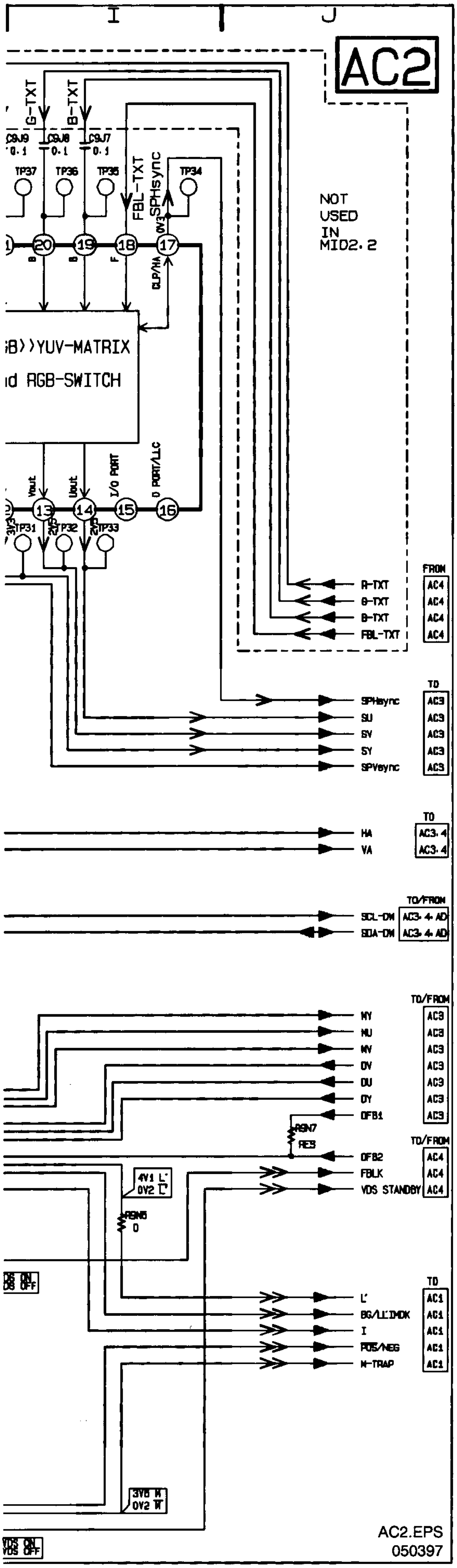
AC2 Double Windo


A
B
C
1
2
3
4
5
6
7
A---ONLY FOR A/P
E---ONLY FOR EUROPE
GND
1BA2
TO/FROM
TXT-MAIN
TUN-CVBS
TXT-CVBS
TO/FROM S51 SSP K
CVBS/Y-PIP
C-PIP
GND-PIP
NC
+5V2
+8V5
+40V
SCL
SDA
1BA3 DW51
2V2 INT 1V6 EXT
EXT Y/C=1V5 EXT CVBS=0V4 INT=0V8
TP15
TP16
TP17
+5V2
+40V
+8VA
C9L3 0.047
IC9L 4053
3 Channel 1 TO 2 DECODER
VDD
8V2
1V2
INT 2V6 EXT 2V4
R9K2 2200
Q9N4 2SA1586
R9K1 220
R9K3 0
TP10
TP11
A NOT USED
SC-1FH/HA
VA
1BA1
TP12
TP13
R937 0
+5VA
+5V2
C9M3 2200P
R9N0 6.8 1/4W
R9N1 22 1/4W
R938 0
Q9N0 2SC2873
R9N3 100
R9N2 1K
R9N4 150
C9N0 47 16V
Z9N0
A 02CZ8.2
E 02CZ5.6
TP18
TP19
TP20
FL9N BLM21A
C9N1 0.1
TP22
TP23
TP24
TP25
TP26
TP27
TP28
TP29
Y-MAIN
U-MAIN
V-MAIN
Y-DW
U-DW
V-DW
FBLK
SC-1FH
VA
R9N8 0
R9N9 0
R9M1 0
1BA5 DW55 B TYPE
FBLK
0V2 VBB OFF
4V7 VBB ON

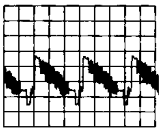
Video-DualScreen-Platine / Platine Video DualScreen

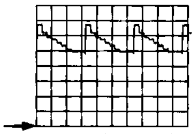

D
E
F
G
H
Y/CVBS PIP OR TUN-CVBS
C-PIP
RESERVE
+8V8
R9J8
X9K3
C9M4
Q9J0
47K
X9K1 3.579MHz
X9K2 4.433MHz
R9J6 1M
R9J7 1M
R9J4 1M
R9J5 1M
C9K8 15P
C9K7 18P
C9K9 0.1
R9K4 10M
R9K5 10M
R9K6 10M
R9J3 68K
C9K6 0.1
C9K0 2200P
C9K4 0.1
C9K3 0.1
C9K2 0.1
C9K1 2200P
R9J2 22K
C9K0 0.47 35V
Q9J1
Q9J2
R9J9
R9K0
C9M5
SECAM-REF
2ND-XTAL
REF-XTAL
C-PLL
FLT-REF
A-GND
CVBS in
C in
HPLL
FSCOMB
ABSin/CVBSout
YC-FILTER / SWITCH
SYNC
DELAY
SUM
CHROMA DECODER
CONTROL
IC9J
TDA9143
-(R-Y)
-(B-Y)
Uin
Vin
SCL
SDA
Vp
Sigsup
D-GND
SC
VA
Yout
TP30
C9J0 0.1
C9J1 0.1
C9J2 0.1
C9J3 0.1
R9J0 100
R9J1 100
C9J4 16V
C9J5 0.1
SCL-DW
SDA-DW
+8V8
+8VA
R9K9 RES
R9K8 10K
LEVEL CONVERTER
INH
VEE
VSS
VDS EXT1/2/3/FRONT 5V2
VDS INTERNAL 0V1
INT/EXT
TP38
( ):NO VDS>60sec.=STANDBY DS
+5VSW
R9Z9
Q9N1 BUK482-60A
+40V
R9Z3 470K
R9Z4 470K
R9Z5 10K
Q9N2 2SC4116
R9Z6 10K
R9Z7 10K
Q9N3 2SC4116
R9Z8 10K
VDS STANDBY
+5V2
R9M3 470
R9M5 680
Q9M1 2SC4116
Q9M2 2SC4116
R9M6 220
Q9M3 2SA1586
TP21
R9M9
C9M2 RES
R9M4 1500
Z9M1 02CZ3.9
R9M7 1K
TP14
+8V8
VA
R9M2 RES
SC-1FH
C9N2 0.1
C9N3 47 16V
HA
VA
+5VSW
FL9P BLM21A05
C9B8 150P
C9M8 150P
C9L2 0.1
C9L1 47 16V
n.c.
Uout
Vout
GND1
Vp1
DELAY
SUM
PLL-TIMING
IC9K
TDA4665T
FL9R BLM21A05
Vp2
GND2
i.c.
C9L0 0.1
C9M1 47 16V
R9N6 RES
R9Z0
R9Z1
R9Z2
E
A
IC9M
TDA8601T
IOCNTR
FBI1
FBI2
FBo
VIDoA
VIDoB
VIDoC
VSS
DECODING
VDD
VID1A1
VID1B1
VID1C1
SEL
VID1A2
VID1B2
VID1C2
FL98 BLM21A05
C9L4 10 16V
C9L5 0.22
C9L6 0.22
C9L7 0.22
C9L8 0.22
C9L9 0.22
C9M0 0.22
SDA-DW
SCL-DW
4V1 B6
0V1 B6
C9M7 0.1
R9L6 100
R9L5 100
R9L9 1K
R9L8 2200
R9L7 1K
R9L4 RES
IC9N
PCF8574AT
VDD
SDA
SCL
INT
P7
P6
P5
P4
RESET
L.P.F.
IIC Bus CONTROL
SHIFT RESISTER
8 bit
I/O PORTS
read plus
write plus
A0
A1
A2
P0
P1
P2
P3
VSS
FBLK
R800
R801
R802
R803
Zab.
R9L0 RES
R9L1 RES
R9L2 1K
R9L3 2200
3V7 NEG
0V1 POS
R-TXT

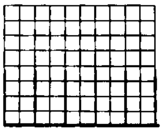
Video DualScreen panel /

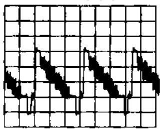

I
J
AC2
G-TXT
B-TXT
C9J9 0.1
C9J8 0.1
C9J7 0.1
TP37
TP36
TP35
TP34
FBL-TXT
SPHsync
0V3
20
19
18
17
CLP/HA
NOT USED IN MID2.2
B>>YUV-MATRIX
d RGB-SWITCH
Vout
Uout
I/O PORT
D PORT/LLC
13
14
15
16
TP31
TP32
TP33
FROM
R-TXT AC4
G-TXT AC4
B-TXT AC4
FBL-TXT AC4
TO
SPHsync AC3
SU AC3
SV AC3
SY AC3
SPVsync AC3
TO
HA AC3,4
VA AC3,4
TO/FROM
SCL-DM AC3,4,AD
SDA-DM AC3,4,AD
TO/FROM
MY AC3
MU AC3
MV AC3
DV AC3
DU AC3
DY AC3
DFB1 AC3
R9N7 RES
TO/FROM
DFB2 AC4
FBLK AC4
VDS STANDBY AC4
4V1 L'
0V2 L'
R9N5 0
DS ON
DS OFF
TO
L' AC1
BG/LL'IMDK AC1
I AC1
POS/NEG AC1
N-TRAP AC1
3V6 N
0V2 N
VDS ON
VDS OFF

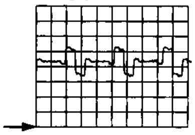
AC2.EPS
050397

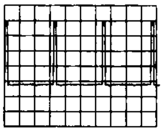

PIN2 IC9L
0.5V / div AC
20µs / div

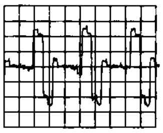

TP31
0.5V / div DC
20µs / div

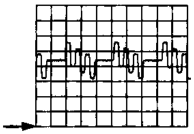

TP30 11-9143
1V / div AC
10ms / div

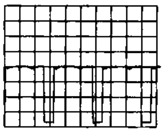

PIN26 IC9J
0.2V / div AC
20µs / div

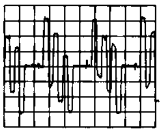

TP32
0.5V / div DC
20µs / div

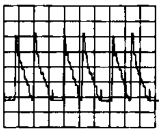

TP34 17-9143
1V / div AC
20µs / div

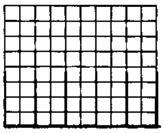

PIN1 IC9J
0.1V / div AC
20µs / div

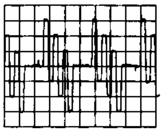

TP33
0.5V / div DC
20µs / div

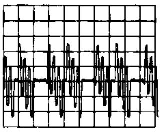

Pin93 IC9A 2-IC4053
1V / div AC
20µs / div

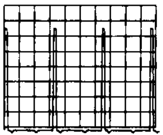

PIN2 IC9J
0.1V / div AC
20µs / div

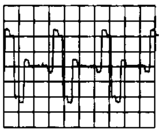

TP01 6-8601
0.2V / div AC
20µs / div

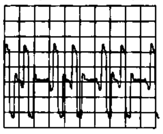

TP14 5-P51
1V / div AC
10ms / div

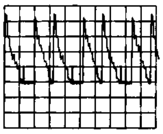

PIN3 IC9J
0.2V / div AC
20µs / div

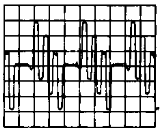

TP02 7-8601
0.2V / div AC
20µs / div

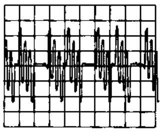

TP21 4-P51
0.5V / div AC
20µs / div

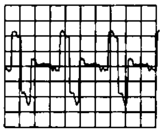

PIN4 IC9J
0.2V / div AC
20µs / div

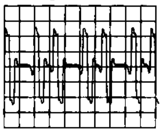

TP03 8-8601
0.2V / div AC
20µs / div

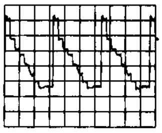

TP26
0.2V / div AC
20µs / div


TP24
0.2V / div AC
20µs / div


TP27
0.2V / div AC
20µs / div

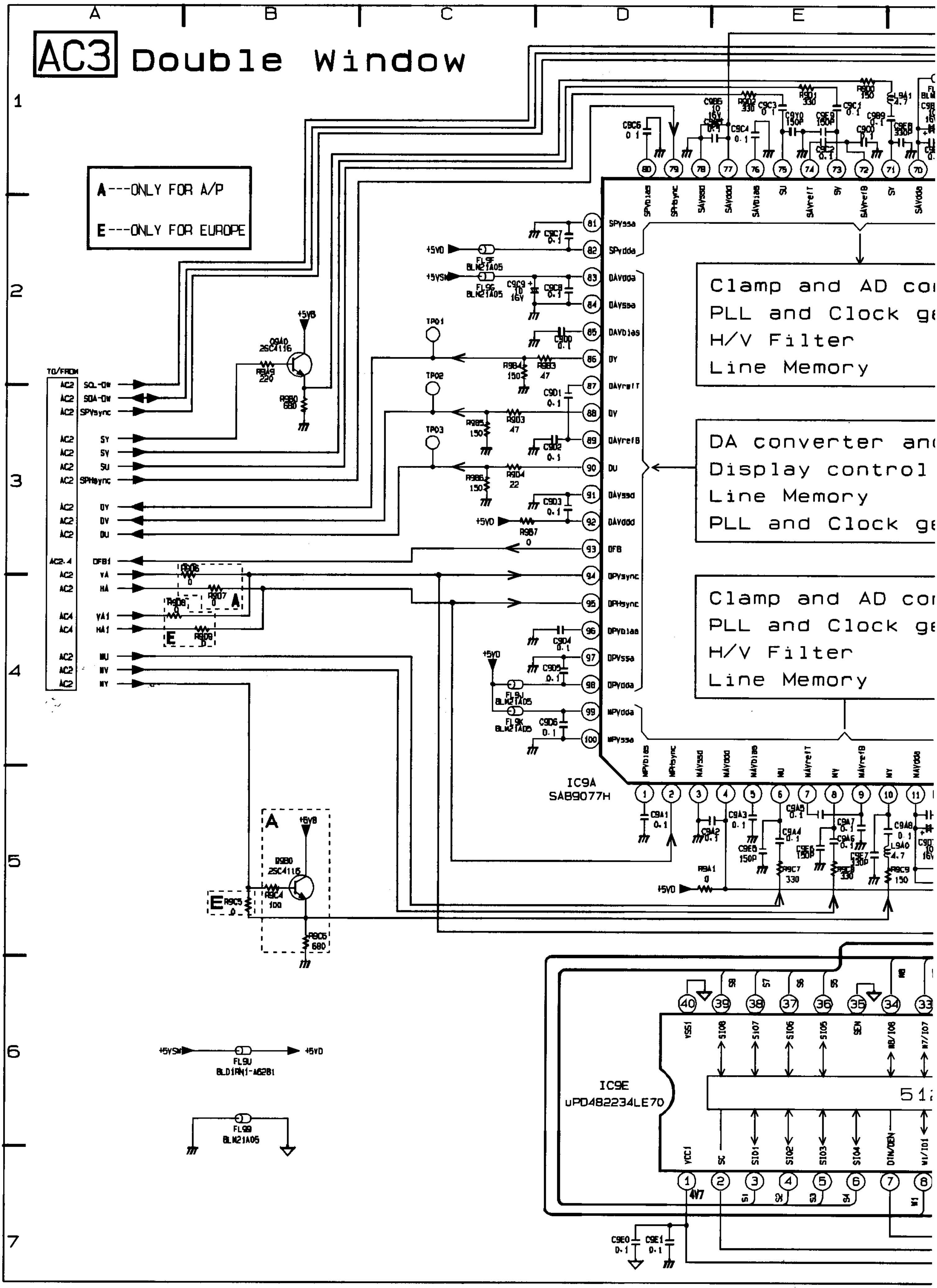

TP25
0.2V / div AC
20µs / div

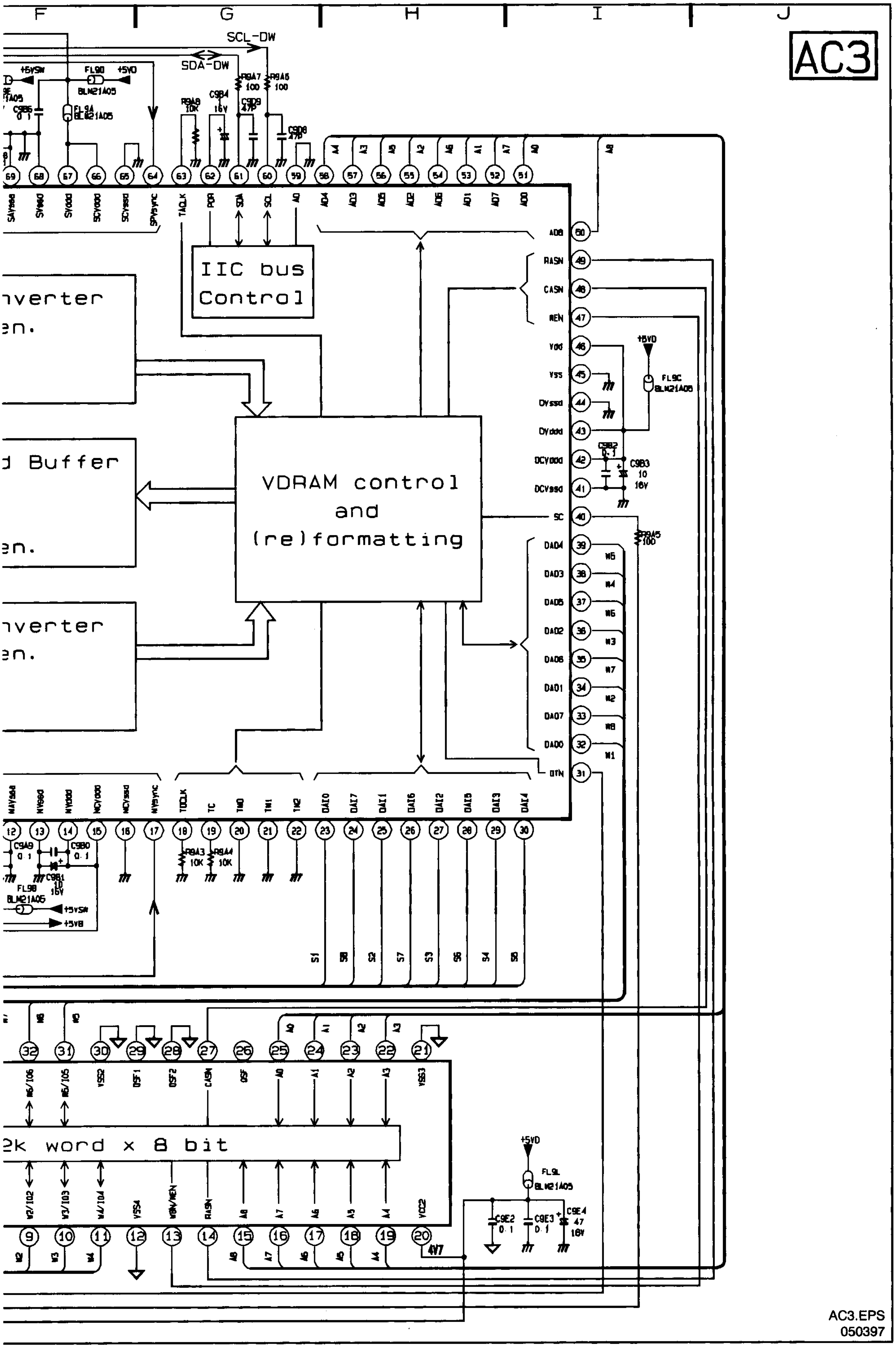

TP28
0.2V / div AC
20µs / div


TP23
0.2V / div AC
20µs / div

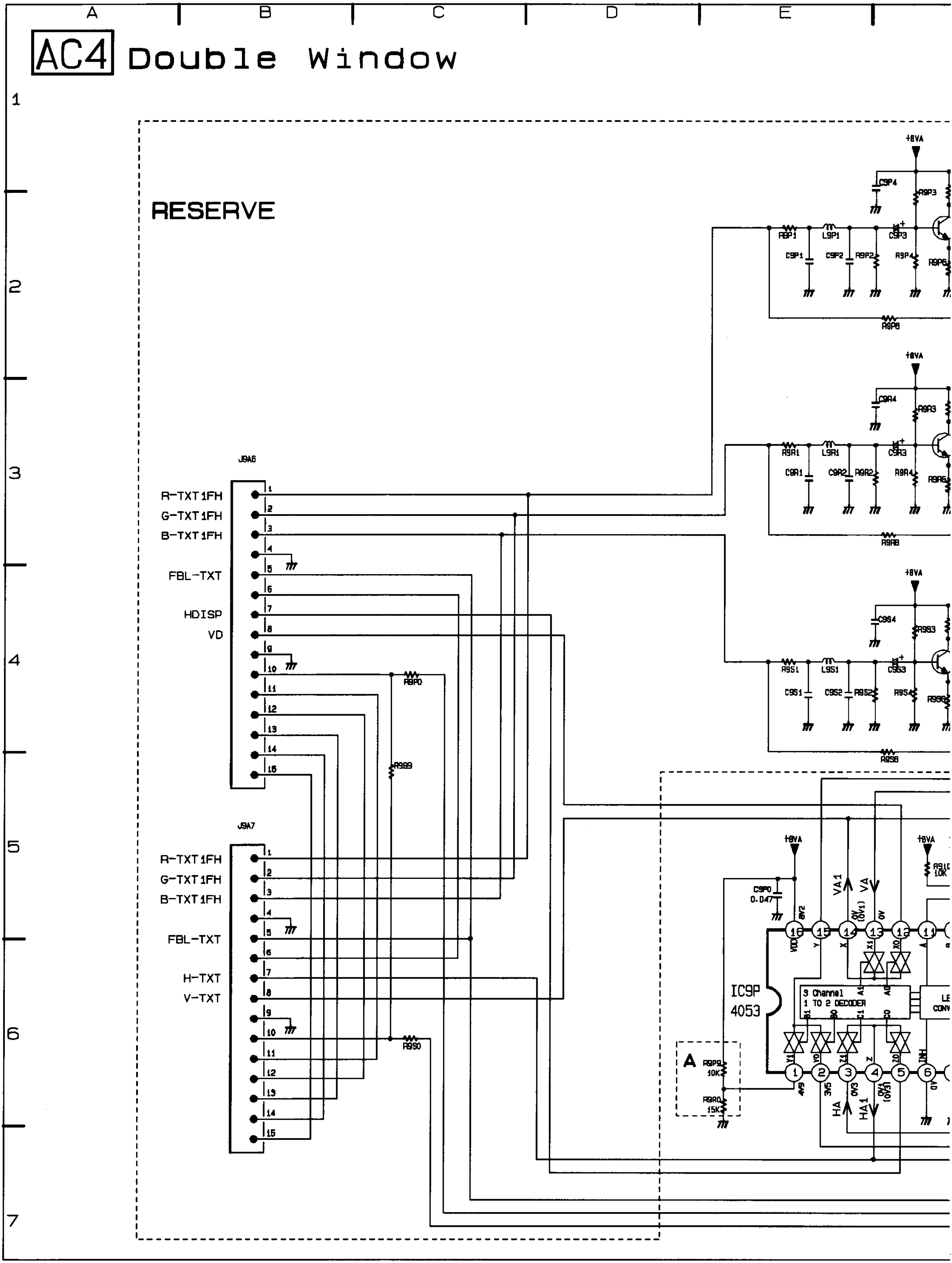
OSC_AC1-2.AI
050397

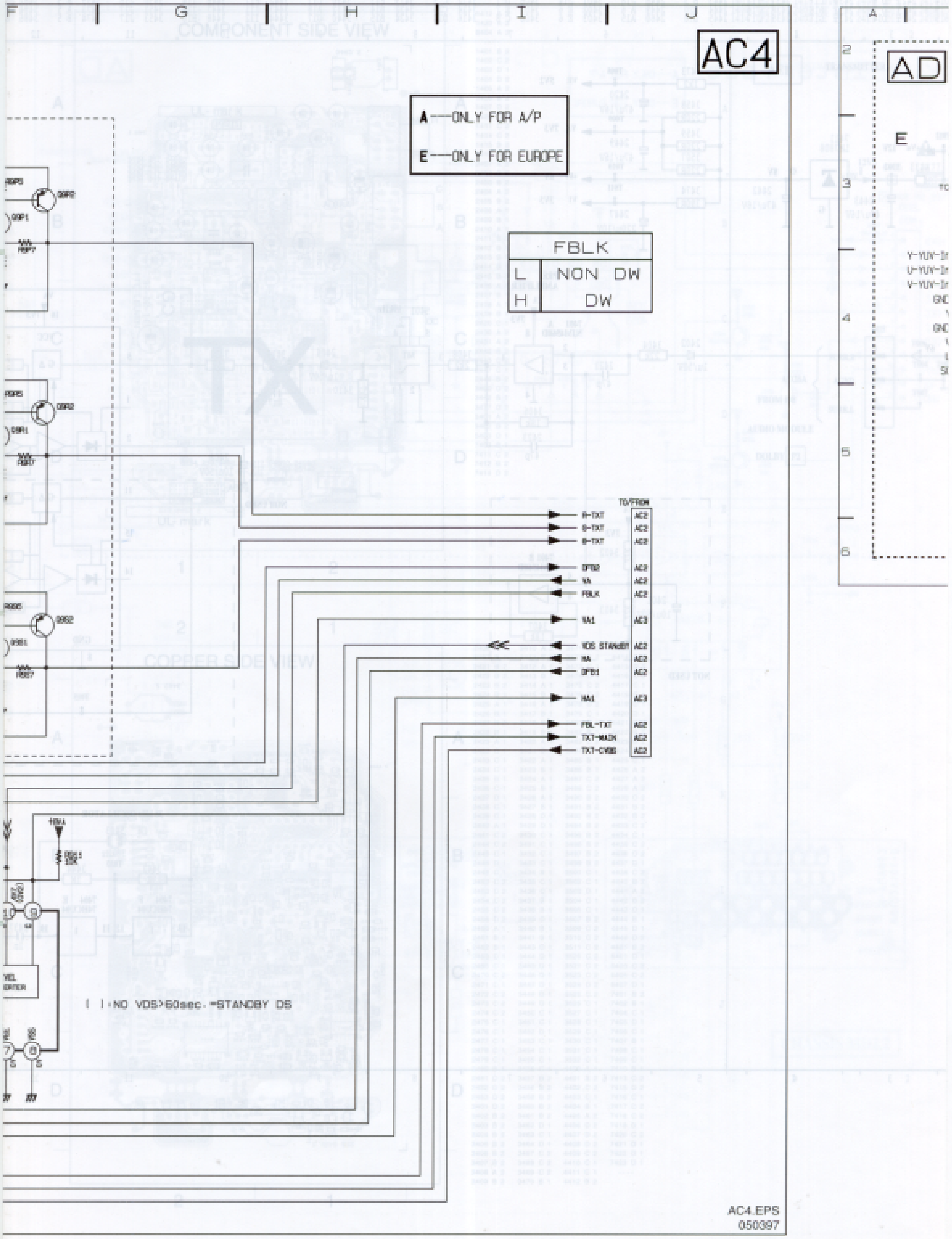
Video DualScreen panel / Video-DualScreen-Platine /


A
B
C
D
E
1
2
3
4
5
6
7
AC3 Double Window
A---ONLY FOR A/P
E---ONLY FOR EUROPE
TO/FROM
AC2 SCL-DW
AC2 SDA-DW
AC2 SPVsync
AC2 SY
AC2 SV
AC2 SU
AC2 SPHsync
AC2 DY
AC2 DV
AC2 DU
AC2.4 DFB1
AC2 VA
AC2 HA
AC4 VA1
AC4 HA1
AC2 MU
AC2 MV
AC2 MY
Q9A0 2SC4116
R9A9 220
R980 680
+5VB
+5VD
+5VSW
FL9F BLM21A05
FL9G BLM21A05
TP01
TP02
TP03
R984 150
R983 47
R985 150
R903 47
R986 150
R904 22
R987 0
R906 0
R907 0
R908 0
R909 0
Clamp and AD co
PLL and Clock g
H/V Filter
Line Memory
DA converter an
Display control
Line Memory
PLL and Clock g
Clamp and AD co
PLL and Clock g
H/V Filter
Line Memory
IC9A
SAB9077H
SPYssa
SPYdda
DAVdda
DAVssa
DAVbias
DY
DAVrefT
DV
DAVrefB
DU
DAVssd
DAVddd
DFB
DPVsync
DPHsync
DPVbias
DPVssa
DPVdda
MPVdda
MPVssa
FL9J BLM21A05
FL9K BLM21A05
Q9B0 2SC4116
R9C4 100
R9C5 0
R9C6 680
R9A1 0
R9C7 330
R9C8 330
R9C9 150
L9A0 4.7
L9A1 4.7
FL9U BLD1RN1-A628I
FL99 BLM21A05
IC9E
uPD482234LE70
VSS1
SIO8
SIO7
SIO6
SIO5
SCN
MB/IO8
M7/IO7
VCC1
SC
SIO1
SIO2
SIO3
SIO4
DIN/DEN
W1/IO1
4V7
C9E0 0.1
C9E1 0.1
512


F
G
H
I
J
AC3
SCL-DW
SDA-DW
+5VSW
FL90
+5VD
BLM21A05
C9B6 0.1
FL9A BLM21A05
R9A9 10K
C9B4 16V
R9A7 100
R9A6 100
C9D9 47P
C9D8 47P
SAYssd
SYssd
SYddd
SCYddd
SCYssd
SPYsync
TAQLK
POR
SDA
SCL
A0
AD4
AD3
AD5
AD2
AD6
AD1
AD7
AD0
A4
A3
A5
A2
A6
A1
A7
A0
A8
AD8
RASN
CASN
WEN
Vdd
Vss
DYssd
DYddd
DCYddd
DCYssd
SC
DAO4
DAO3
DAO5
DAO2
DAO6
DAO1
DAO7
DAO0
OTN
+5VD
FL9C BLM21A05
C9B2 0.1
C9B3 10 16V
R9A5 100
W5
W4
W6
W3
W7
W2
W8
W1
IIC bus Control
nverter en.
d Buffer en.
nverter en.
VDRAM control and (re)formatting
NAVssd
NYssd
NYddd
NCYddd
NCYssd
NYsync
TDCLK
TC
TM0
TM1
TM2
DAI0
DAI7
DAI1
DAI6
DAI2
DAI5
DAI3
DAI4
C9A9 0.1
C9B0 0.1
C9B1 10 16V
FL9B BLM21A05
+5VSW
+5VB
R9A3 10K
R9A4 10K
S1
S8
S2
S7
S3
S6
S4
S5
W6
W5
VSS2
DSF1
DSF2
CASN
DSF
A0
A1
A2
A3
VSS3
W6/IO6
W5/IO5
2k word x 8 bit
W2/IO2
W3/IO3
W4/IO4
VSS4
WBN/WEN
RASN
A8
A7
A6
A5
A4
VCC2
W2
W3
W4
A8
A7
A6
A5
A4
4V7
+5VD
FL9L BLM21A05
C9E2 0.1
C9E3 0.1
C9E4 47 16V
AC3.EPS
050397

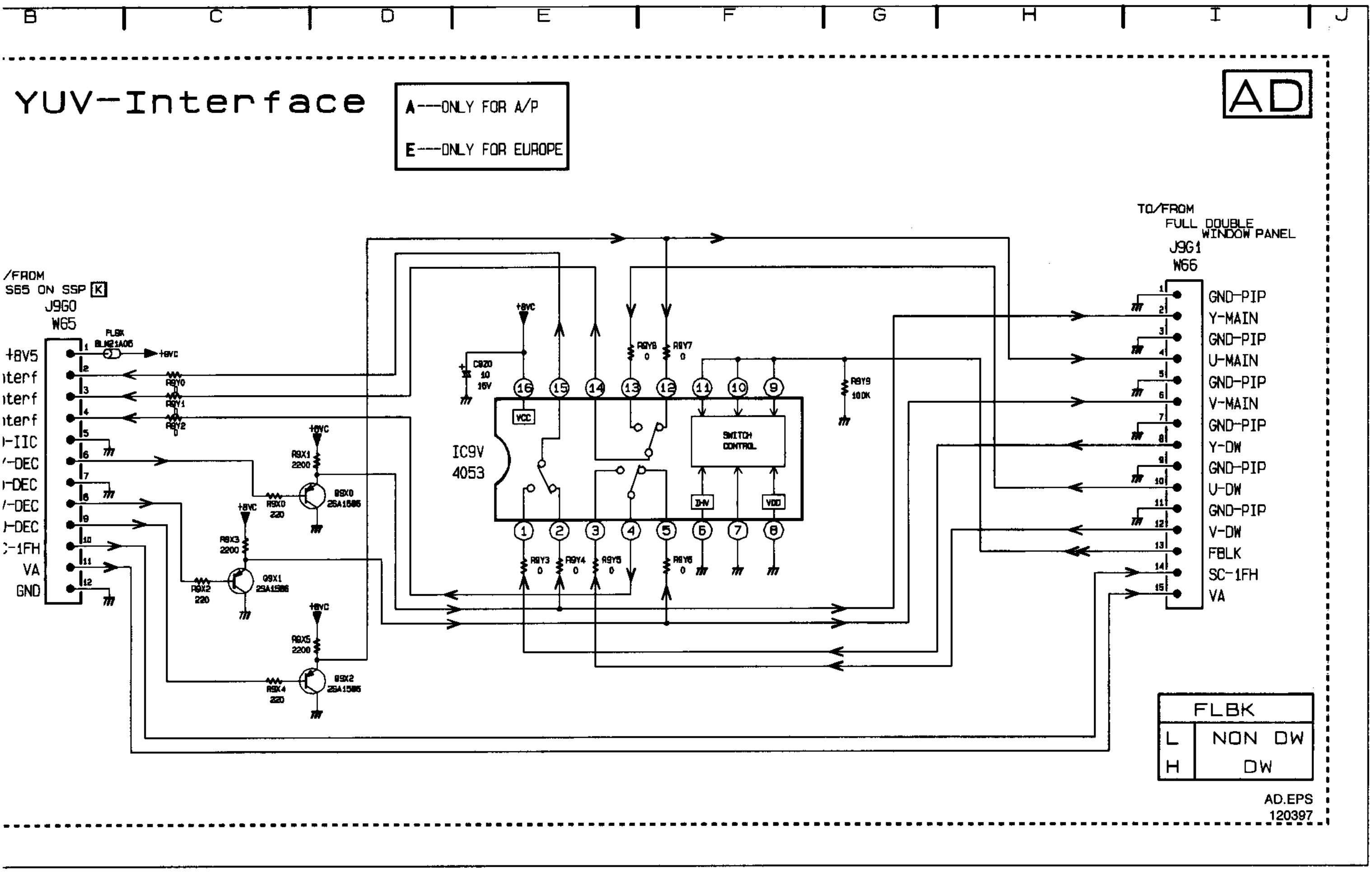
Video DualScreen panel / Video-DualScreen-Platine / Platine Video DualScreen

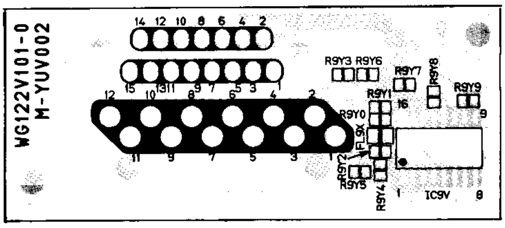

A
B
C
D
E
1
2
3
4
5
6
7
AC4 Double Window
RESERVE
J9A6
R-TXT1FH
G-TXT1FH
B-TXT1FH
FBL-TXT
HDISP
VD
J9A7
R-TXT1FH
G-TXT1FH
B-TXT1FH
FBL-TXT
H-TXT
V-TXT
R9P0
R9S9
R9S0
+8VA
C9P4
R9P3
R9P1
L9P1
C9P3
C9P1
C9P2
R9P2
R9P4
R9P6
R9P8
C9R4
R9R3
R9R1
L9R1
C9R3
C9R1
C9R2
R9R2
R9R4
R9R6
R9R8
C9S4
R9S3
R9S1
L9S1
C9S3
C9S1
C9S2
R9S2
R9S4
R9S6
R9S8
C9P0
0.047
IC9P
4053
3 Channel
1 TO 2 DECODER
VDD
Y
X
X1
X0
A
A1
A0
B1
B0
C1
C0
Y1
Y0
Z1
Z
Z0
INH
VA1
VA
HA
HA1
8V2
0V
(0V1)
4V9
3V5
0V3
0V1
(0V3)
A
R9P9
10K
R9R0
15K
R910
10K

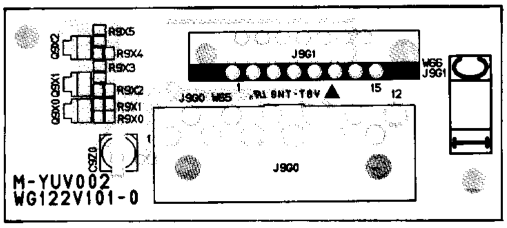

F
G
H
I
J
AC4
AD
A---ONLY FOR A/P
E---ONLY FOR EUROPE
FBLK
L
NON DW
H
DW
E
TO/FROM
R-TXT AC2
G-TXT AC2
B-TXT AC2
DFB2 AC2
VA AC2
FBLK AC2
VA1 AC3
VDS STANDBY AC2
HA AC2
DFB1 AC2
HA1 AC3
FBL-TXT AC2
TXT-MAIN AC2
TXT-CVBS AC2
Q6P2
Q6P1
Q6R2
Q6R1
Q6B2
Q6B1
Y-YUV-In
U-YUV-In
V-YUV-In
GND
( ) =NO VDS>60sec.=STANDBY DS
2
3
4
5
6

AC4.EPS
050397

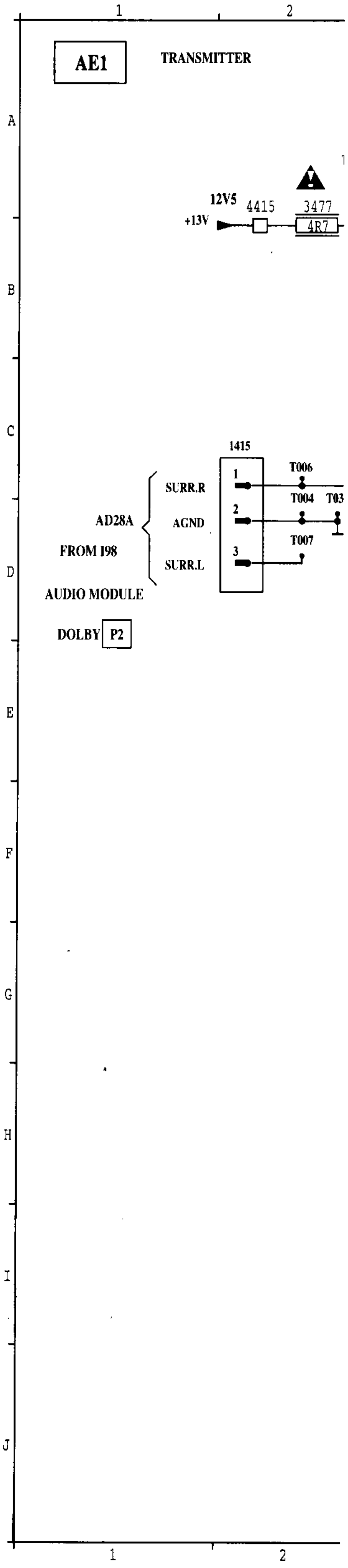
YUV-interface panel / YUV-Schnittstellenplatine / Platine YUV-interface


B
C
D
E
F
G
H
I
J
YUV-Interface
A---ONLY FOR A/P
E---ONLY FOR EUROPE
AD
/FROM
S65 ON SSP K
J9G0
W65
+8V5
nterf
nterf
nterf
-IIC
-DEC
-DEC
-DEC
-DEC
-1FH
VA
GND
FLBK
BLM21A05
+8VC
R9Y0
R9Y1
R9Y2
R9X0 220
R9X1 2200
R9X2 220
R9X3 2200
R9X4 220
R9X5 2200
Q9X0 2SA1586
Q9X1 2SA1586
Q9X2 2SA1586
C9Z0 10 16V
IC9V
4053
VCC
SWITCH CONTROL
INH
VDD
R9Y3 0
R9Y4 0
R9Y5 0
R9Y6 0
R9Y7 0
R9Y8 0
R9Y9 100K
TO/FROM
FULL DOUBLE WINDOW PANEL
J9G1
W66
GND-PIP
Y-MAIN
GND-PIP
U-MAIN
GND-PIP
V-MAIN
GND-PIP
Y-DW
GND-PIP
U-DW
GND-PIP
V-DW
FBLK
SC-1FH
VA
FLBK
L NON DW
H DW
AD.EPS
120397

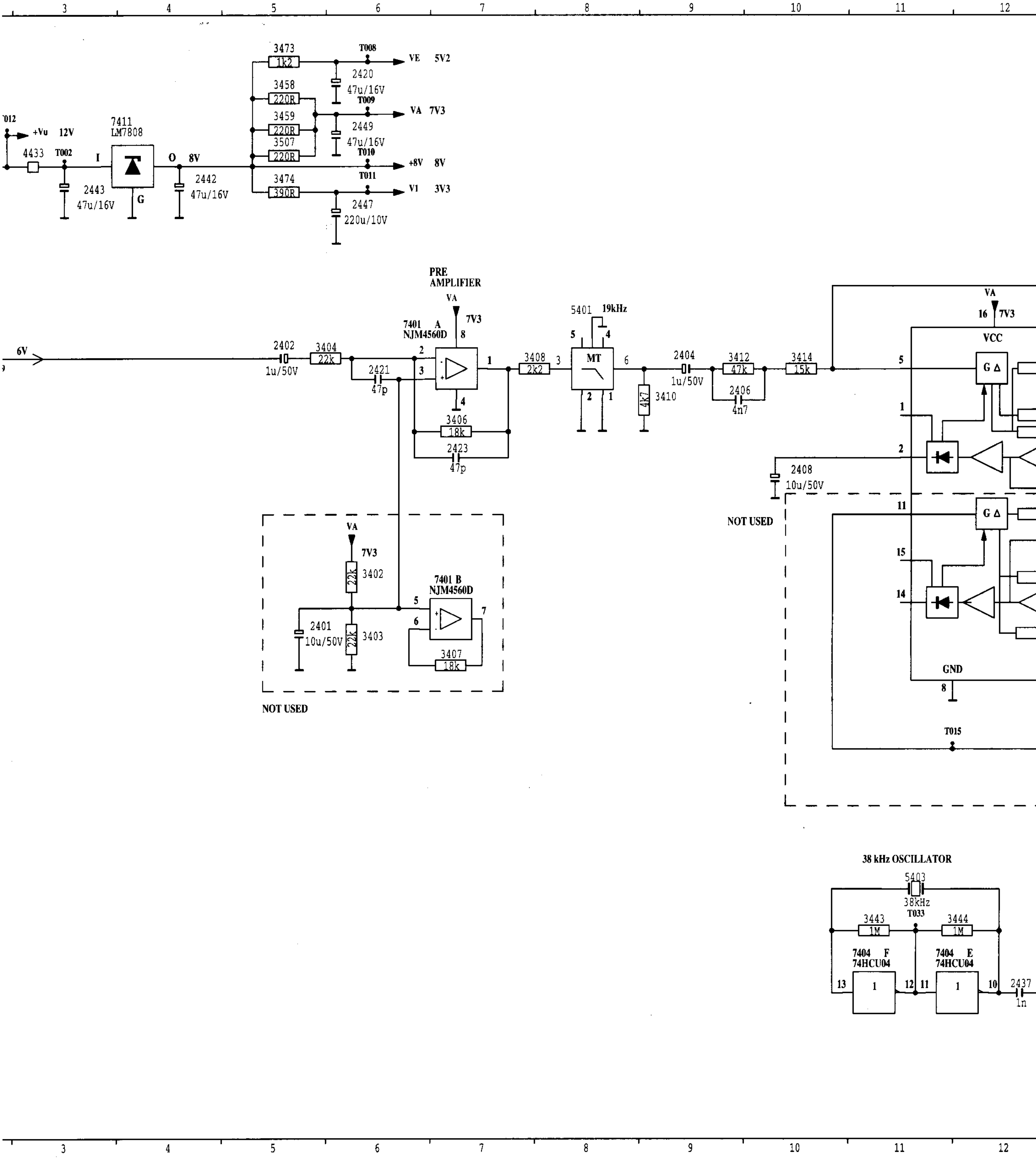

WG122V101-0
M-YUV002
R9Y3 R9Y6
R9Y7
R9Y8
R9Y9
R9Y0
R9Y1
R9Y2
R9Y5
R9Y4
IC9V


R9X5
R9X4
R9X3
R9X2
R9X1
R9X0
Q9X2
Q9X1
Q9X0
J9G1
W66
J9G1
J9G0 W65
J9G0
C9Z0
M-YUV002
WG122V101-0

1403	E18	1415	C 2	2404	C 9	2412
1407	H21	1419	J14	2406	D 9	2414
1408	E21	2401	E 5	2408	D11	2416
1414	F21	2402	C 5	2410	D15	2418

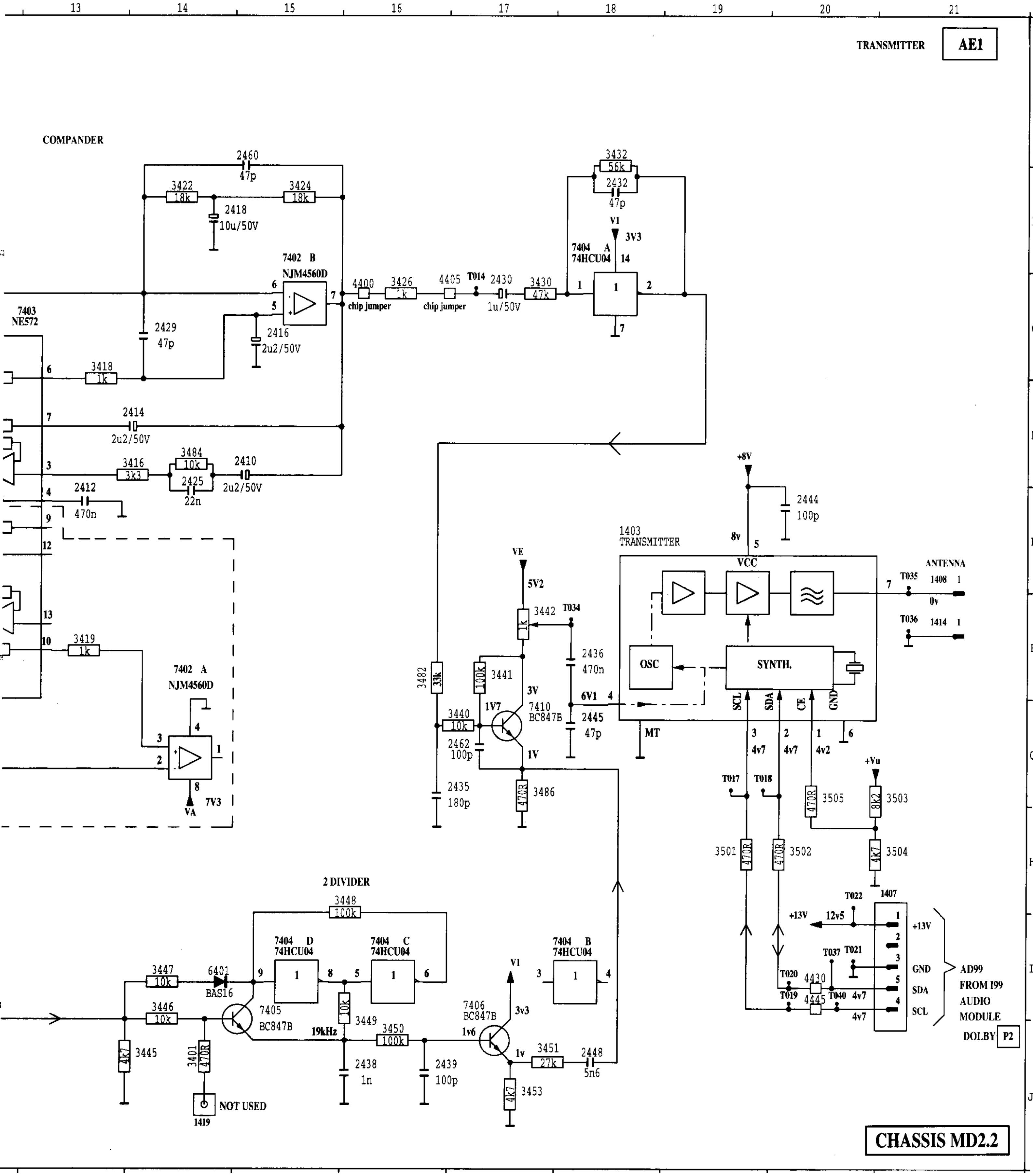

1
2
A
B
C
D
E
F
G
H
I
J
AE1
TRANSMITTER
12V5
+13V
4415
3477
4R7
1415
1
2
3
T006
T004
T03
T007
SURR.R
AGND
SURR.L
AD28A
FROM 198
AUDIO MODULE
DOLBY
P2

E13	2420	A 6	2429	C14	2436	F18	2442	B 4	2447	B 6	2462	G17	3404	C 6	3410	D 9	3418	C13	3426	C16	3441	F17	3445	J14	3449	J16	3458	A 5	3477	
14	2421	D 6	2430	C17	2437	I12	2443	B 3	2448	J18	3401	J14	3406	D 7	3412	C 9	3419	F13	3430	C17	3442	F17	3446	I14	3450	J16	3459	A 5	3482	
15	2423	D 7	2432	B18	2438	J16	2444	E20	2449	A 6	3402	E 6	3407	E 7	3414	C10	3422	B14	3432	A18	3443	I11	3447	I14	3451	J17	3473	A 5	3484	
15	2425	D14	2435	G17	2439	J17	2445	G18	2460	A15	3403	E 6	3408	C 8	3416	D14	3424	B15	3440	G17	3444	I12	3448	H16	3453	J17	3474	B 5	3486	

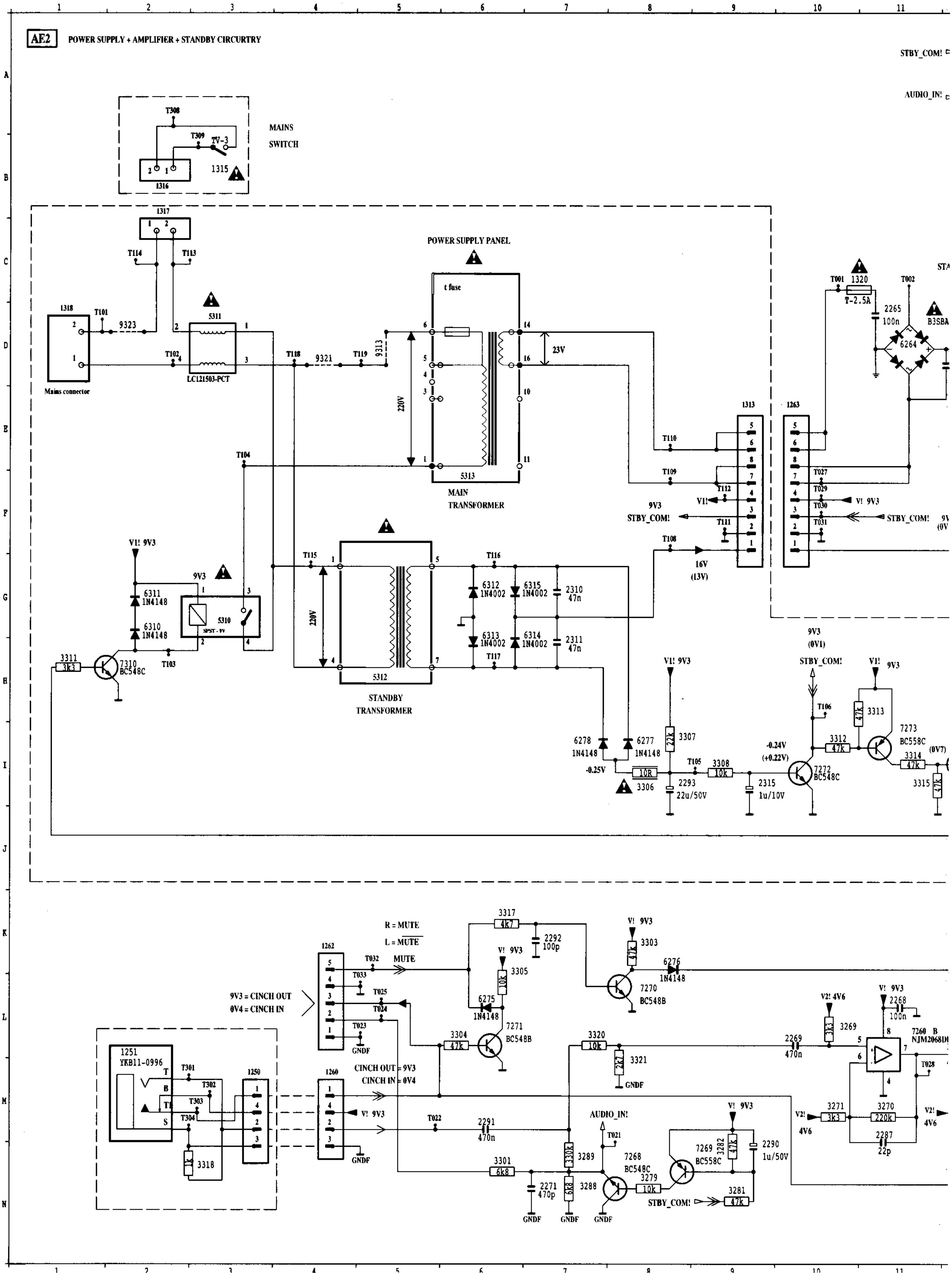

3
4
5
6
7
8
9
10
11
12
3473
1k2
T008
VE 5V2
2420
47u/16V
3458
220R
T009
VA 7V3
3459
220R
2449
47u/16V
3507
220R
T010
+8V 8V
3474
390R
T011
V1 3V3
2447
220u/10V
T012
+Vu 12V
7411
LM7808
4433
T002
I
O
G
8V
2443
47u/16V
2442
47u/16V
PRE AMPLIFIER
VA
7V3
7401 A
NJM4560D
6V
2402
1u/50V
3404
22k
2421
47p
3406
18k
2423
47p
3408
2k2
5401
19kHz
MT
3410
4k7
2404
1u/50V
3412
47k
2406
4n7
3414
15k
VCC
GΔ
2408
10u/50V
NOT USED
GND
T015
VA
7V3
3402
22k
2401
10u/50V
3403
22k
7401 B
NJM4560D
3407
18k
NOT USED
38 kHz OSCILLATOR
5403
38kHz
T033
3443
1M
3444
1M
7404 F
74HCU04
7404 E
74HCU04
2437
1n

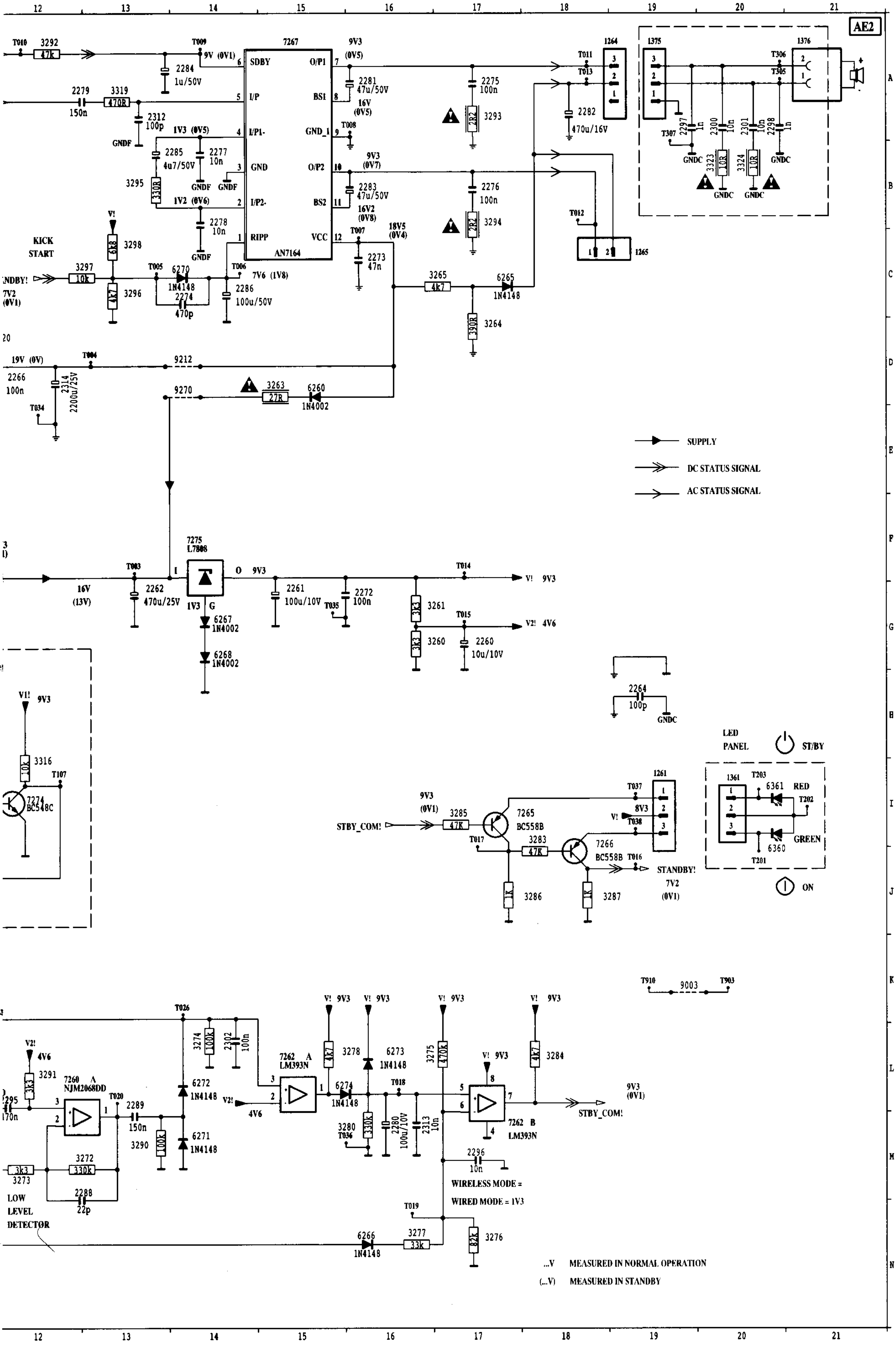
Wireless Dolby / Drahtlos-Dolby / Dolby sans fil

2	3501	H19	3505	G20	4415	A 2	5401	C 8	7401	E 7	7404	B18	7404	I11	7410	G17
16	3502	H20	3507	A 5	4430	I20	5403	H11	7402	F14	7404	I17	7404	I11	7411	A 3
14	3503	G21	4400	C16	4433	A 3	6401	I14	7402	B15	7404	I16	7405	I15		
17	3504	H21	4405	C17	4445	I20	7401	C 6	7403	C13	7404	I15	7406	I17		



13
14
15
16
17
18
19
20
21
TRANSMITTER
AE1
COMPANDER
2460
47p
3422
18k
3424
18k
2418
10u/50V
7402 B
NJM4560D
7403
NE572
2429
47p
2416
2u2/50V
3418
1k
2414
2u2/50V
3416
3k3
3484
10k
2425
22n
2410
2u2/50V
2412
470n
3419
1k
7402 A
NJM4560D
VA
7V3
4400
chip jumper
3426
1k
4405
chip jumper
T014
2430
1u/50V
3430
47k
3432
56k
2432
47p
V1
3V3
7404 A
74HCU04
+8V
2444
100p
8v
1403
TRANSMITTER
VCC
OSC
SYNTH.
SCL
SDA
CE
GND
MT
ANTENNA
T035
1408
0v
T036
1414
VE
5V2
3442
1k
T034
2436
470n
6V1
2445
47p
3441
100k
3V
1V7
7410
BC847B
1V
3440
10k
2462
100p
3482
33k
2435
180p
3486
470R
4v7
4v2
+Vu
T017
T018
3505
470R
3503
8k2
3501
470R
3502
470R
3504
4k7
T022
1407
+13V
12v5
T037
T021
T020
4430
T040
T019
4445
GND
SDA
SCL
AD99
FROM I99
AUDIO
MODULE
DOLBY
P2
2 DIVIDER
3448
100k
7404 D
74HCU04
7404 C
74HCU04
7404 B
74HCU04
3447
10k
6401
BAS16
3446
10k
7405
BC847B
3449
10k
19kHz
3450
100k
7406
BC847B
1v6
3v3
1v
3451
27k
2448
5n6
3453
4k7
2438
1n
2439
100p
3445
4k7
3401
470R
NOT USED
1419
CHASSIS MD2.2

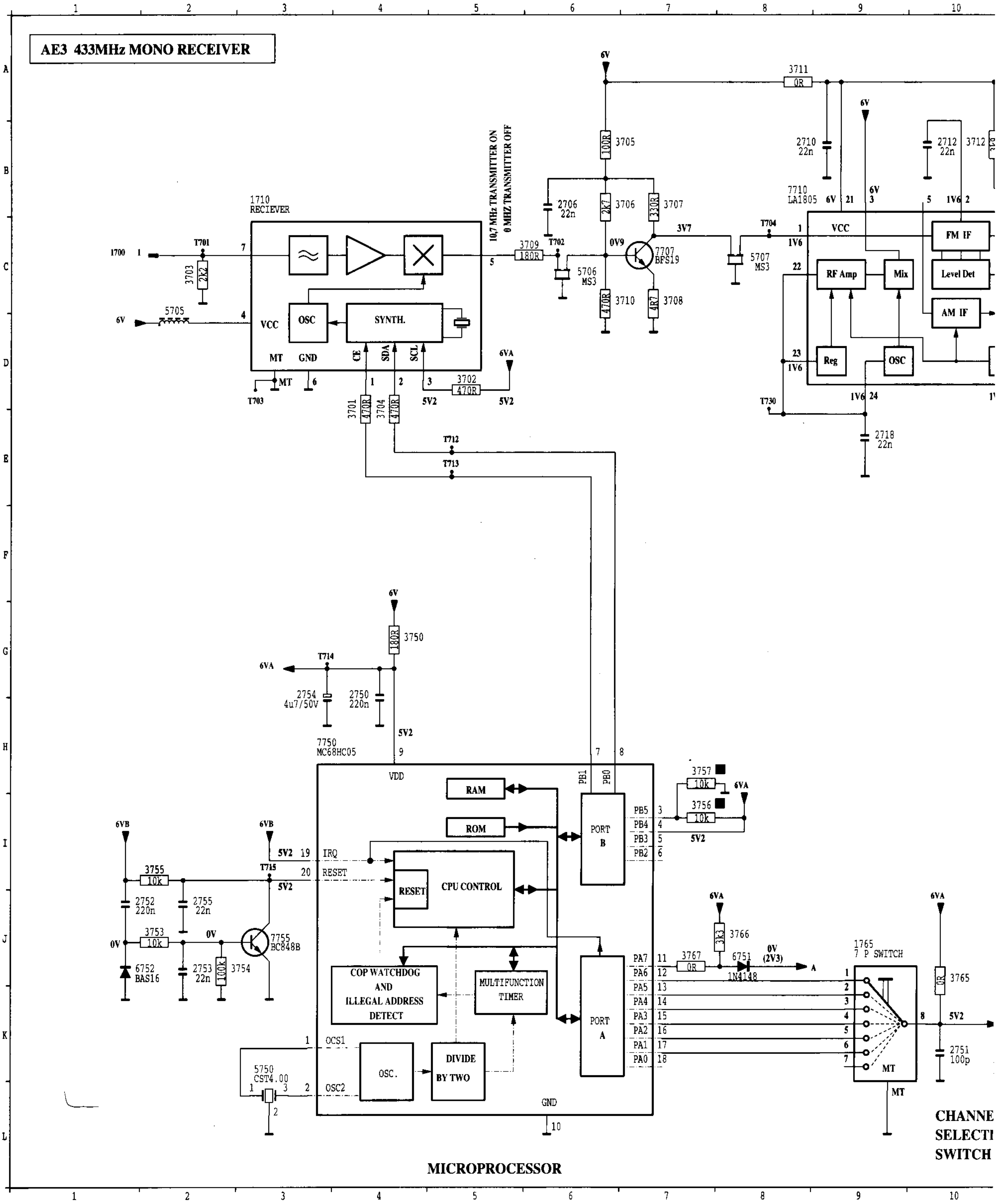

AE2
POWER SUPPLY + AMPLIFIER + STANDBY CIRCURTRY
MAINS
SWITCH
T308
T309
TV-3
1316
1315
1317
T114
T113
1318
T101
9323
Mains connector
T102
5311
LC121503-PCT
T118
9321
T119
9313
POWER SUPPLY PANEL
t fuse
220V
23V
5313
MAIN
TRANSFORMER
T104
1313
T110
T109
T112
V1!
9V3
STBY_COM!
T111
T108
16V
(13V)
1263
T027
T029
T030
T031
V! 9V3
STBY_COM!
T001
1320
T-2.5A
T002
2265
100n
B3SBA
6264
STBY_COM!
AUDIO_IN!
V1! 9V3
6311
1N4148
6310
1N4148
9V3
5310
SPST - 9V
T103
3311
3k3
7310
BC548C
T115
5312
STANDBY
TRANSFORMER
T116
6312
1N4002
6315
1N4002
2310
47n
6313
1N4002
6314
1N4002
2311
47n
T117
6278
1N4148
6277
1N4148
-0.25V
10R
3306
V1! 9V3
22k
3307
T105
3308
10k
2293
22u/50V
2315
1u/10V
9V3
(0V1)
STBY_COM!
T106
-0.24V
(+0.22V)
3312
47k
7272
BC548C
V1! 9V3
47k
3313
7273
BC558C
(0V7)
3314
47k
3315
47k
R = MUTE
L = MUTE
1262
T032
MUTE
T033
T025
T024
T023
GNDF
9V3 = CINCH OUT
0V4 = CINCH IN
3317
4k7
2292
100p
V! 9V3
10k
3305
6275
1N4148
7271
BC548B
3304
47k
V! 9V3
47k
3303
6276
1N4148
7270
BC548B
3320
10k
2k7
3321
GNDF
1251
YKB11-0996
T
B
TL
S
T301
T302
T303
T304
1250
3318
1k
1260
CINCH OUT = 9V3
CINCH IN = 0V4
V! 9V3
GNDF
T022
2291
470n
3301
6k8
2271
470p
GNDF
330k
3289
6k8
3288
AUDIO_IN!
T021
7268
BC548C
3279
10k
GNDF
STBY_COM!
V! 9V3
7269
BC558C
3282
47k
2290
1u/50V
3281
47k
V2! 4V6
3k3
3269
V! 9V3
2268
100n
7260 B
NJM2068D
2269
470n
T028
V2!
4V6
3271
3k3
3270
220k
2287
22p
V2!
4V6


AE2
12
13
14
15
16
17
18
19
20
21
A
B
C
D
E
F
G
H
I
J
K
L
M
N
T010
3292
47k
T009
9V (0V1)
2284
1u/50V
7267
AN7164
SDBY
I/P
I/P1-
GND
I/P2-
RIPP
O/P1
BS1
GND_1
O/P2
BS2
VCC
9V3
(0V5)
2281
47u/50V
16V
(0V5)
T008
9V3
(0V7)
2283
47u/50V
16V2
(0V8)
T007
18V5
(0V4)
2273
47n
2279
150n
3319
470R
2312
100p
GNDF
1V3 (0V5)
2285
4u7/50V
2277
10n
3295
330R
1V2 (0V6)
2278
10n
KICK
START
3298
6k8
3297
10k
3296
4k7
T005
6270
1N4148
2274
470p
T006
7V6 (1V8)
2286
100u/50V
STANDBY!
7V2
(0V1)
2275
100n
3293
2R2
2276
100n
3294
2R2
3265
4k7
6265
1N4148
3264
390R
T011
T013
1264
2282
470u/16V
T012
1265
1375
1376
T306
T305
T307
2297
1n
2300
10n
2301
10n
2298
1n
3323
10R
3324
10R
GNDC
19V (0V)
T004
9212
2266
100n
2314
2200u/25V
T034
9270
3263
27R
6260
1N4002
SUPPLY
DC STATUS SIGNAL
AC STATUS SIGNAL
7275
L7808
T003
16V
(13V)
2262
470u/25V
1V3
G
O
9V3
6267
1N4002
6268
1N4002
2261
100u/10V
T035
2272
100n
T014
V1! 9V3
3261
3k3
T015
V2! 4V6
3260
3k3
2260
10u/10V
2264
100p
LED
PANEL
ST/BY
1361
T203
6361
RED
T202
GREEN
6360
T201
ON
1261
T037
8V3
T038
9V3
(0V1)
STBY_COM!
3285
47K
7265
BC558B
T017
3283
47K
7266
BC558B
T016
STANDBY!
7V2
(0V1)
3286
1K
3287
1K
V1! 9V3
3316
10k
T107
7274
BC548C
T910
9003
T903
T026
3274
100k
2302
100n
7262 A
LM393N
3278
4k7
6273
1N4148
3275
470k
3284
4k7
V2! 4V6
3291
3k3
7260 A
NJM2068DD
T020
2289
150n
3290
100k
6272
1N4148
6271
1N4148
6274
1N4148
T018
3280
T036
330k
2280
100u/10V
2313
10n
7262 B
LM393N
STBY_COM!
9V3
(0V1)
2296
10n
WIRELESS MODE =
WIRED MODE = 1V3
T019
6266
1N4148
3277
33k
3276
82k
3273
3k3
3272
330k
2288
22p
LOW
LEVEL
DETECTOR
...V MEASURED IN NORMAL OPERATION
(...V) MEASURED IN STANDBY

1250	M 3	9212	D14
1251	L 2	9270	D14
1260	M 4	9313	D 5
1261	I19	9321	D 4
1262	K 4	9323	D 2
1263	E10		
1264	A18		
1265	C19		
1313	E 9		
1315	B 3		
1316	B 2		
1317	B 2		
1318	D 1		
1320	C11		
1361	I20		
1375	A19		
1376	A21		
2260	G17		
2261	G15		
2262	G13		
2264	H19		
2265	D11		
2266	D12		
2268	L11		
2269	L10		
2271	N 7		
2272	G16		
2273	C16		
2274	C14		
2275	A17		
2276	B17		
2277	B14		
2278	B14		
2279	A12		
2280	M16		
2281	A16		
2282	A18		
2283	B16		
2284	A14		
2285	B14		
2286	C14		
2287	M11		
2288	M13		
2289	L13		
2290	N 9		
2291	M 5		
2292	K 7		
2293	I 8		
2295	L12		
2296	M17		
2297	A19		
2298	A20		
2300	A20		
2301	A20		
2302	L14		
2310	G 7		
2311	H 7		
2312	A13		
2313	M16		
2314	D12		
2315	I 9		
3260	G17		
3261	G17		
3263	D15		
3264	D17		
3265	C17		
3269	L10		
3270	M11		
3271	M10		
3272	M13		
3273	M12		
3274	L14		
3275	L16		
3276	N17		
3277	N16		
3278	L16		
3279	N 8		
3280	M16		
3281	N 9		
3282	N 9		
3283	I18		
3284	L18		
3285	I17		
3286	J18		
3287	J19		
3288	N 7		
3289	N 7		
3290	M13		
3291	L12		
3292	A12		
3293	A17		
3294	B17		
3295	B13		
3296	C13		
3297	C13		
3298	C13		
3301	N 6		
3303	K 8		
3304	L 6		
3305	K 6		
3306	I 8		
3307	I 8		
3308	I 9		
3311	H 1		
3312	I10		
3313	H11		
3314	I11		
3315	I11		
3316	I12		
3317	K 6		
3318	N 3		
3319	A13		
3320	L 7		
3321	M 8		
3323	B20		
3324	B20		
5310	G 3		
5311	D 3		
6260	D15		
6264	D11		
6265	C17		
6266	N16		
6267	G14		
6268	G14		
6270	C14		
6271	M14		
6272	L14		
6273	L16		
6274	L15		
6275	L 6		
6276	K 8		
6277	I 8		
6278	I 7		
6310	G 2		
6311	G 2		
6312	G 6		
6313	G 6		
6314	G 7		
6315	G 7		
6360	I20		
6361	I20		
7260	L12		
7260	L11		
7262	L15		
7262	M17		
7265	I17		
7266	I18		
7267	A15		
7268	N 8		
7269	N 9		
7270	L 8		
7271	L 6		
7272	I10		
7273	I11		
7274	I12		
7275	F14		
7310	H 2		
9003	K19		

1700	C 1
1710	B 3
1765	J 9
1791	E21
2706	B 6
2710	B 8
2712	B10
2714	B12
2715	B12
2716	B13
2718	E 9
2720	E14
2731	F15
2732	G16
2750	G 4
2751	K10
2752	J 2
2753	J 2
2754	G 3
2755	J 2
2770	H14
2771	I12
2772	I12
2773	J12
2774	J12
2779	H15
2780	J15
2781	J16
2782	H17
2783	I17
2790	G19
2791	G20
2792	F20
2794	J16
3701	D 4
3702	D 5
3703	C 2
3704	D 4
3705	B 7
3706	B 7
3707	B 7
3708	C 7
3709	C 6
3710	C 7
3711	A 8
3712	B10
3716	B14
3717	E11
3719	E12
3720	E13
3721	E13
3729	F13
3730	F13
3731	G13
3732	F15
3733	G15
3734	F16
3735	G16
3736	F16
3741	G12
3750	G
3753	J
3754	J
3755	I

781	A 3
782	A 3
783	A 3
784	A 3
785	A 3
786	A 3
787	A 3
788	A 3
789	A 3
790	A 3
791	A 2
792	A 3
793	A 2
794	A 3
705	A 1
710	A 2
752	A 1
707	A 1
735	A 2
745	A 3
750	A 1
755	A 1
784	A 3
789	A 2

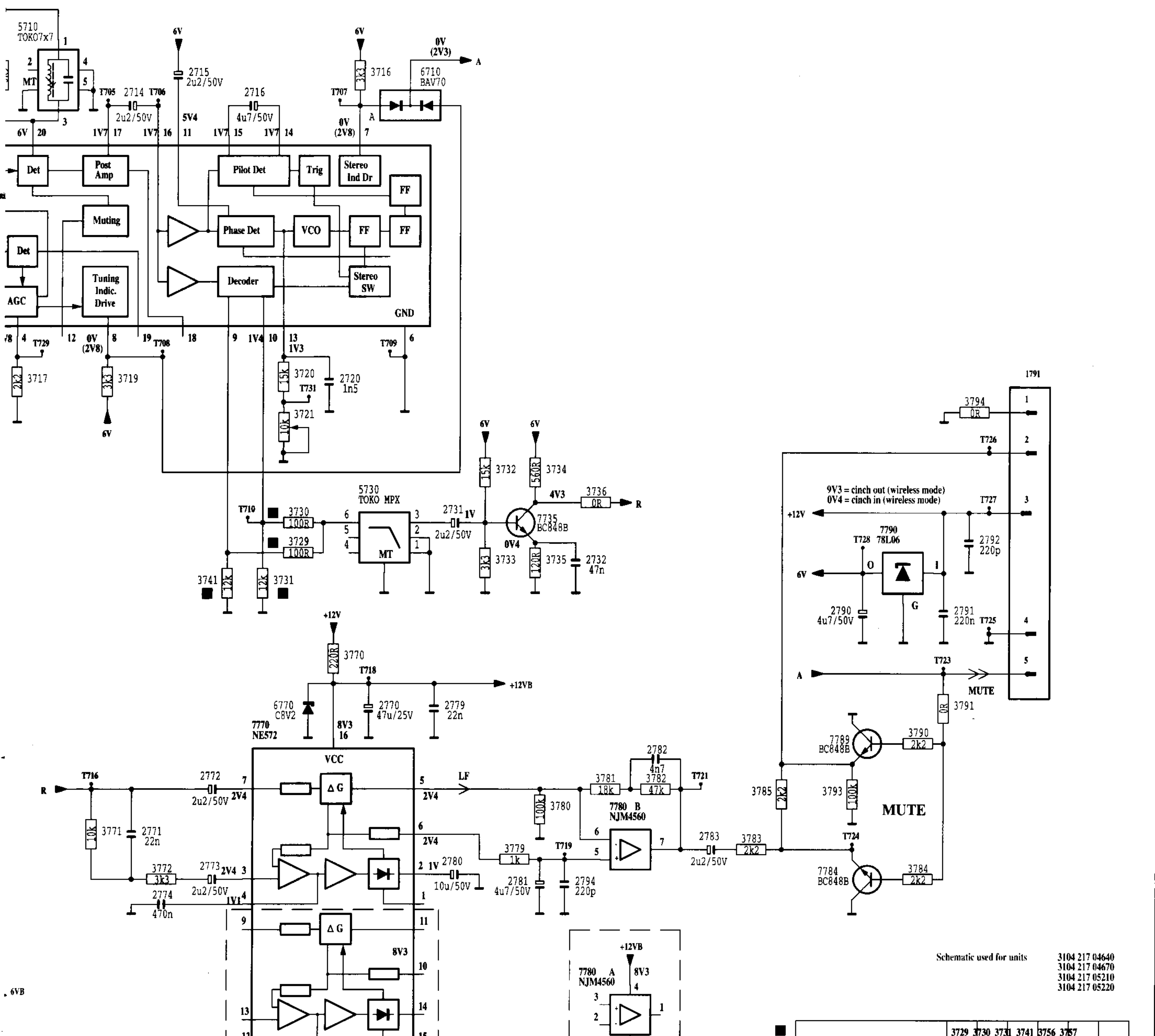

AE3 433MHz MONO RECEIVER
1 2 3 4 5 6 7 8 9 10
A B C D E F G H I J K L
1710
RECIEVER
1700
T701
3703 2k2
6V
5705
VCC
OSC
SYNTH.
MT
GND
CE
SDA
SCL
T703
3701 470R
3704 470R
3702 470R
5V2
6VA
10,7 MHz TRANSMITTER ON
0 MHZ TRANSMITTER OFF
3709 180R
T702
2706 22n
5706 MS3
3705 100R
3706 2K7
3707 330R
0V9
3V7
7707 BFS19
3710 470R
3708 4R7
T704
5707 MS3
3711 0R
2710 22n
2712 22n
3712
7710 LA1805
VCC
1V6
FM IF
RF Amp
Mix
Level Det
AM IF
Reg
OSC
T730
2718 22n
T712
T713
3750 180R
T714
2754 4u7/50V
2750 220n
7750 MC68HC05
VDD
RAM
ROM
PB1
PB0
PORT B
PB5
PB4
PB3
PB2
3757 10k
3756 10k
IRQ
RESET
CPU CONTROL
COP WATCHDOG AND ILLEGAL ADDRESS DETECT
MULTIFUNCTION TIMER
PORT A
PA7
PA6
PA5
PA4
PA3
PA2
PA1
PA0
OCS1
OSC2
OSC.
DIVIDE BY TWO
GND
5750 CST4.00
6VB
3755 10k
T715
2752 220n
2755 22n
3753 10k
0V
7755 BC848B
6752 BAS16
2753 22n
3754 100k
3766 3k3
3767 0R
6751 1N4148
0V (2V3)
A
1765
7 P SWITCH
MT
3765 0R
2751 100p
CHANNE
SELECTI
SWITCH
MICROPROCESSOR

Wireless Dolby / Drahtlos-Dolby / Dolby sans fil

4	3756	I 7	3767	J 7	3779	I16	3783	I18	3791	H20	5706	C 6	5750	K 3	6770	H13	7750	H 3	7780	I16
2	3757	H 7	3770	H14	3780	I16	3784	J20	3793	I19	5707	C 8	6710	B15	7707	C 7	7755	J 3	7784	J19
3	3765	J10	3771	I12	3781	I16	3785	I18	3794	E20	5710	A11	6751	J 8	7710	B 8	7770	H13	7789	H19
2	3766	J 8	3772	J12	3782	I17	3790	H20	5705	C 2	5730	F14	6752	J 2	7735	F16	7780	K16	7790	F19

11 12 13 14 15 16 17 18 19 20 21

AE3

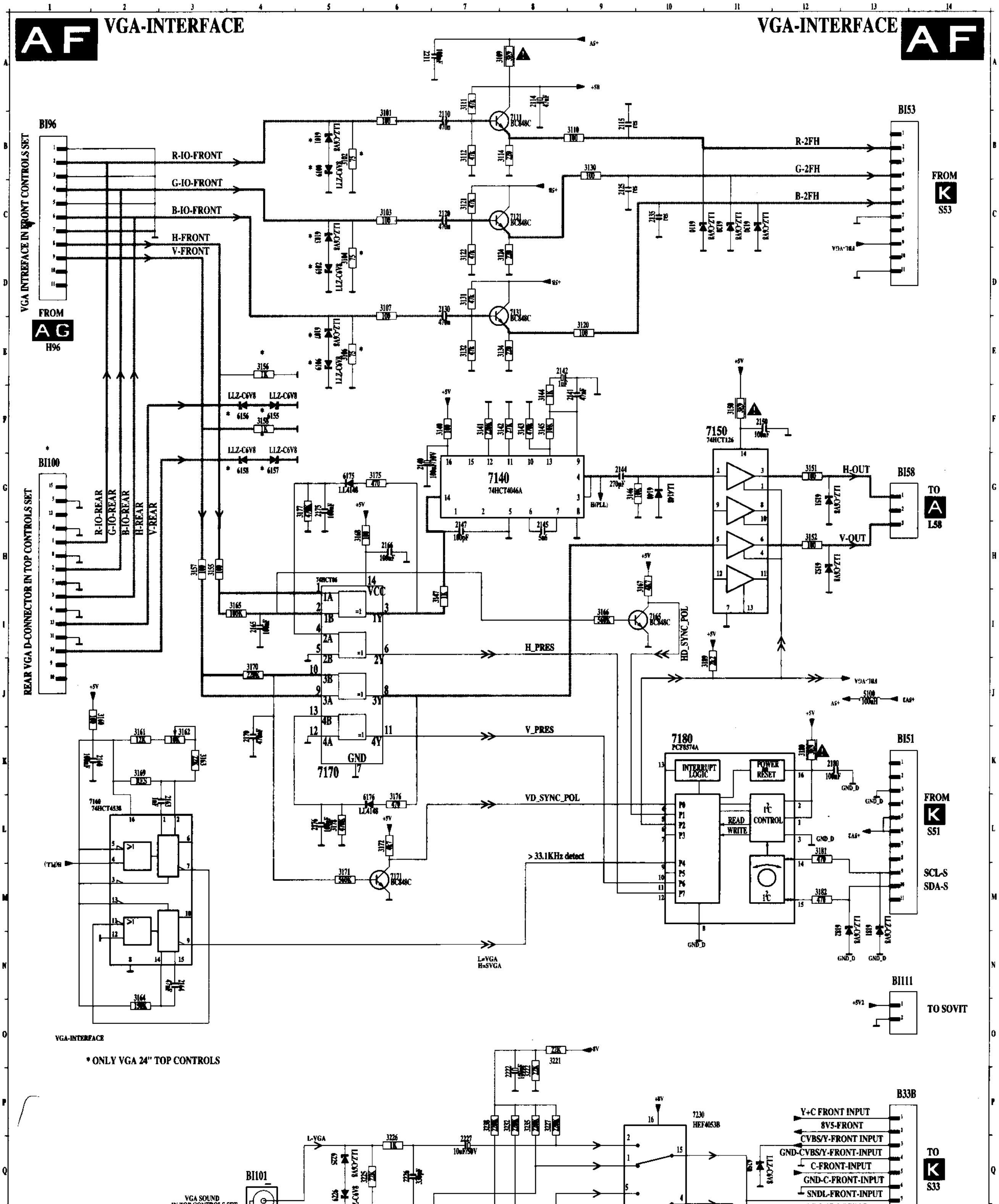

5710
TOKO7x7
MT
6V
T705
2714
T706
2u2/50V
2715
2u2/50V
2716
4u7/50V
5V4
1V7
3716
3k3
6710
BAV70
T707
0V
(2V3)
0V
(2V8)
A
Det
Post Amp
Muting
Det
AGC
Tuning Indic. Drive
Pilot Det
Trig
Stereo Ind Dr
FF
Phase Det
VCO
Decoder
Stereo SW
GND
T729
T708
T709
1V4
1V3
3717
2k2
3719
3k3
3720
15k
2720
1n5
T731
3721
10k
T710
3730
100R
3729
100R
3741
12k
3731
12k
5730
TOKO MPX
MT
2731
2u2/50V
1V
3732
15k
3733
3k3
3734
560R
3735
120R
7735
BC848B
4V3
0V4
3736
0R
R
2732
47n
1791
3794
0R
T726
T727
T725
T723
T728
9V3 = cinch out (wireless mode)
0V4 = cinch in (wireless mode)
+12V
7790
78L06
O
I
G
2792
220p
2790
4u7/50V
2791
220n
MUTE
3791
0R
7789
BC848B
3790
2k2
3793
100k
3785
2k2
T724
7784
BC848B
3784
2k2
MUTE
+12V
3770
220R
T718
+12VB
6770
C8V2
2770
47u/25V
2779
22n
7770
NE572
8V3
VCC
ΔG
T716
R
2772
2u2/50V
2V4
3771
10k
2771
22n
3772
3k3
2773
2u2/50V
2774
470n
1V1
LF
2780
10u/50V
3779
1k
T719
2781
4u7/50V
2794
220p
3780
100k
3781
18k
3782
47k
2782
4n7
T721
7780 B
NJM4560
2783
2u2/50V
3783
2k2
GND
EXPANDER
not used
+12VB
7780 A
NJM4560
8V3
not used
(... V) MUTE STATE
6VB
L
ON

Schematic used for units 3104 217 04640
3104 217 04670
3104 217 05210
3104 217 05220

■	3729	3730	3731	3741	3756	3757
For unit 3104 217 04640 use	-	X	X	-	X	-
3104 217 04670	-	X	X	-	-	X
3104 217 05210	X	-	-	X	X	-
3104 217 05220	X	-	-	X	-	X

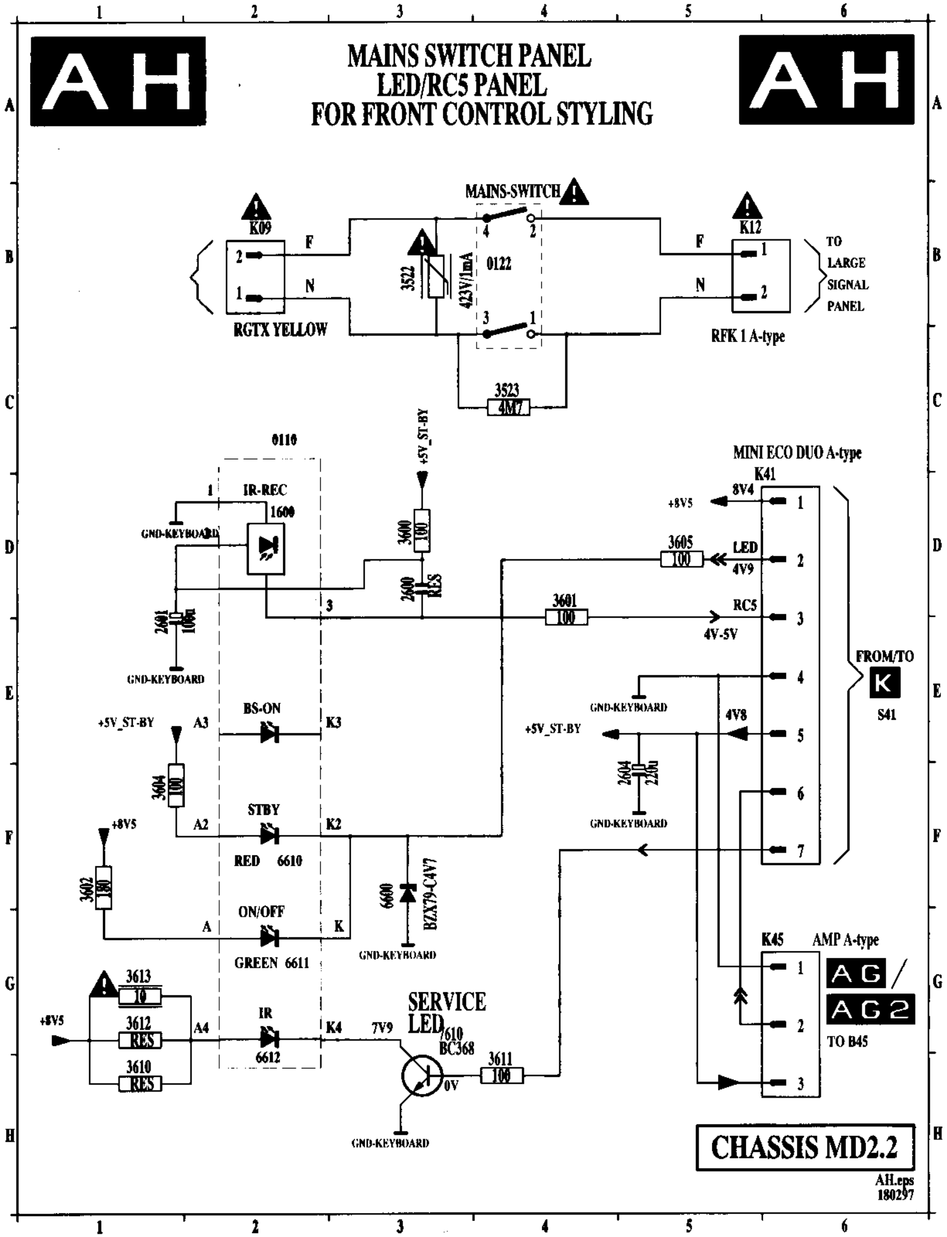
- = item not inserted X = Item inserted

VGA interface panel / VGA-Schnittstellenplatine / Platine VGA-interface


AF
VGA-INTERFACE
VGA-INTERFACE
AF
BI96
VGA INTREFACE IN FRONT CONTROLS SET
FROM
AG
H96
R-IO-FRONT
G-IO-FRONT
B-IO-FRONT
H-FRONT
V-FRONT
BI53
R-2FH
G-2FH
B-2FH
FROM
K
S53
BI100
REAR VGA D-CONNECTOR IN TOP CONTROLS SET
R-IO-REAR
G-IO-REAR
B-IO-REAR
H-REAR
V-REAR
7140
74HCT4046A
7150
74HCT126
H-OUT
V-OUT
BI58
TO
A
L58
7170
74HCT86
VCC
GND
H_PRES
V_PRES
VD_SYNC_POL
> 33.1KHz detect
HD_SYNC_POL
7180
PCF8574A
INTERRUPT LOGIC
POWER ON RESET
READ WRITE
I²C CONTROL
BI51
FROM
K
S51
SCL-S
SDA-S
7160
74HCT4538
L=VGA
H=SVGA
BI111
TO SOVIT
VGA-INTERFACE
* ONLY VGA 24" TOP CONTROLS
BI101
VGA SOUND IN TOP CONTROLS SET
L-VGA
R-VGA
AUDIO IN
7230
HEF4053B
B33B
Y+C FRONT INPUT
8V5-FRONT
CVBS/Y-FRONT INPUT
GND-CVBS/Y-FRONT-INPUT
C-FRONT-INPUT
GND-C-FRONT-INPUT
SNDL-FRONT-INPUT
FRONT-DETECT
SNDR-FRONT-INPUT
TO
K
S33
B33A
Y+C FRONT INPUT
+8V5-FRONT
CVBS/Y-FRONT-INPUT
GND-CVBS/Y-FRONT-INPUT
C-FRONT-INPUT
GND-C-FRONT-INPUT
SNDL-FRONT-INPUT
FRONT-DETECT
SNDR-FRONT-INPUT
FROM
V
H33
FBL-VGA
7242
BC848C
CHASSIS MD2.2

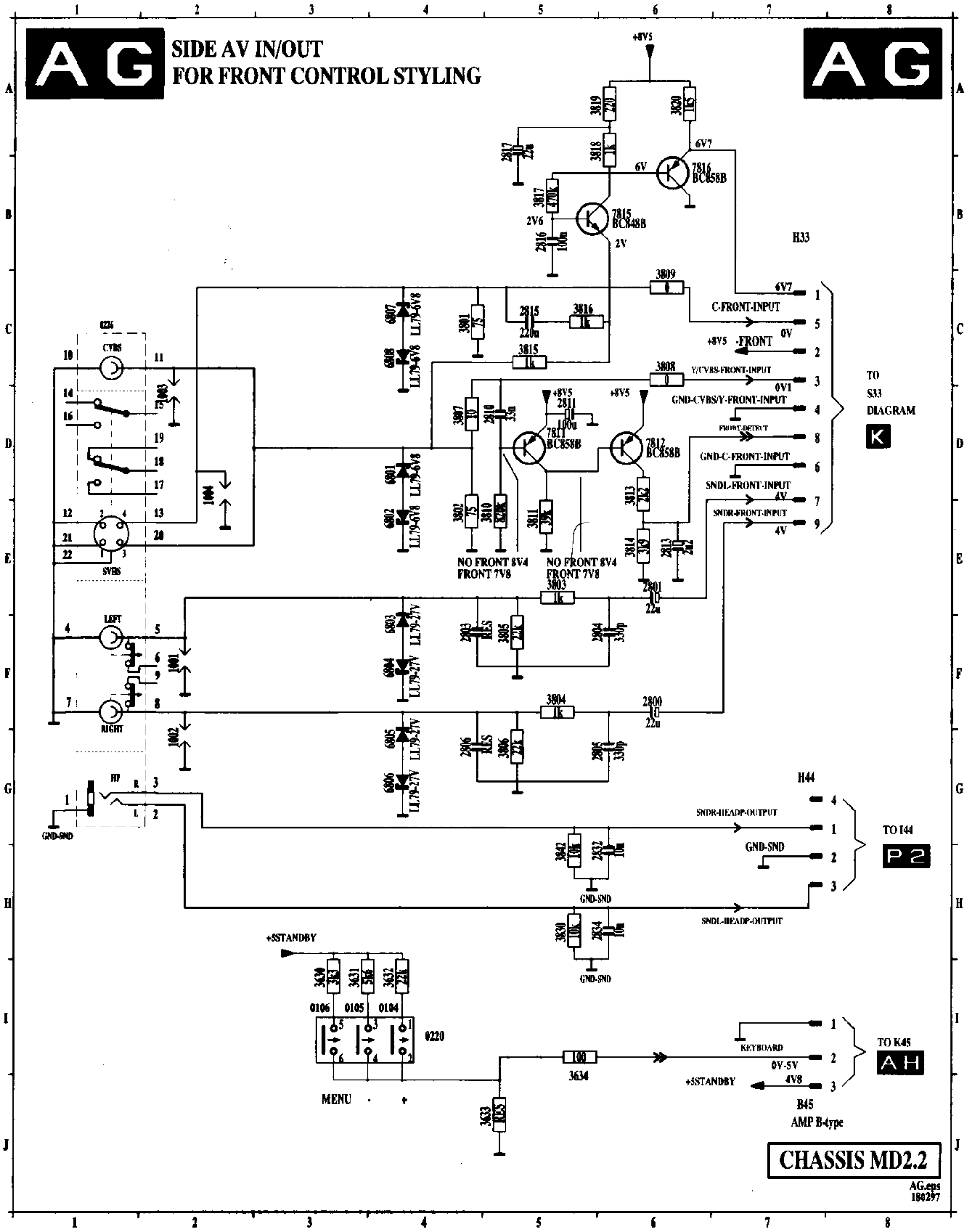
Mains input & RC5 panel (front control styling) / Netzeingang & RC5-Platine (Frontbedienung)/ Platine entrée secteur & RC5 (style commande de sur le haut)

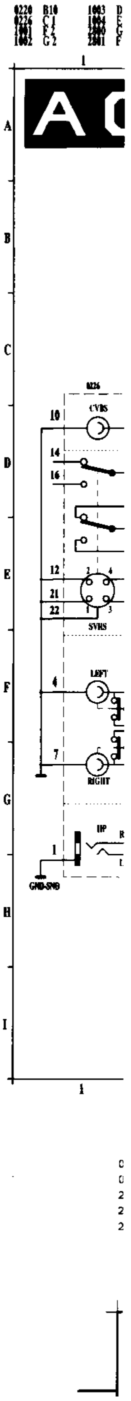
0110	C 2	2601	D 1	3523	C 4	3602	F 1	3610	H 1	3613	G 1	K09	B 2	K45	G 5
0122	B 4	2604	F 5	3600	D 3	3604	F 1	3611	H 4	6600	F 3	K12	B 5		
2600	D 3	3522	B 3	3601	D 4	3605	D 5	3612	G 1	7610	G 3	K41	D 5		


AH
MAINS SWITCH PANEL
LED/RC5 PANEL
FOR FRONT CONTROL STYLING
AH
MAINS-SWITCH
K09
F
N
2
1
RGTX YELLOW
3522
423V/1mA
0122
4
2
3
1
3523
4M7
K12
F
N
1
2
RFK 1 A-type
TO
LARGE
SIGNAL
PANEL
0110
IR-REC
1600
1
3
GND-KEYBOARD
2601
100n
GND-KEYBOARD
+5V_ST-BY
3600
100
2600
RES
3601
100
3605
100
MINI ECO DUO A-type
K41
+8V5
8V4
LED
4V9
RC5
4V-5V
1
2
3
4
5
6
7
GND-KEYBOARD
+5V_ST-BY
4V8
2604
220u
GND-KEYBOARD
FROM/TO
K
S41
+5V_ST-BY
A3
BS-ON
K3
3604
100
+8V5
A2
STBY
K2
RED 6610
3602
180
A
ON/OFF
K
GREEN 6611
6600
BZX79-C4V7
GND-KEYBOARD
3613
10
+8V5
3612
RES
3610
RES
A4
IR
6612
K4
7V9
SERVICE
LED
7610
BC368
0V
3611
100
GND-KEYBOARD
K45
AMP A-type
1
2
3
AG /
AG2
TO B45
CHASSIS MD2.2
AH.eps
180297
1 2 3 4 5 6
A B C D E F G H

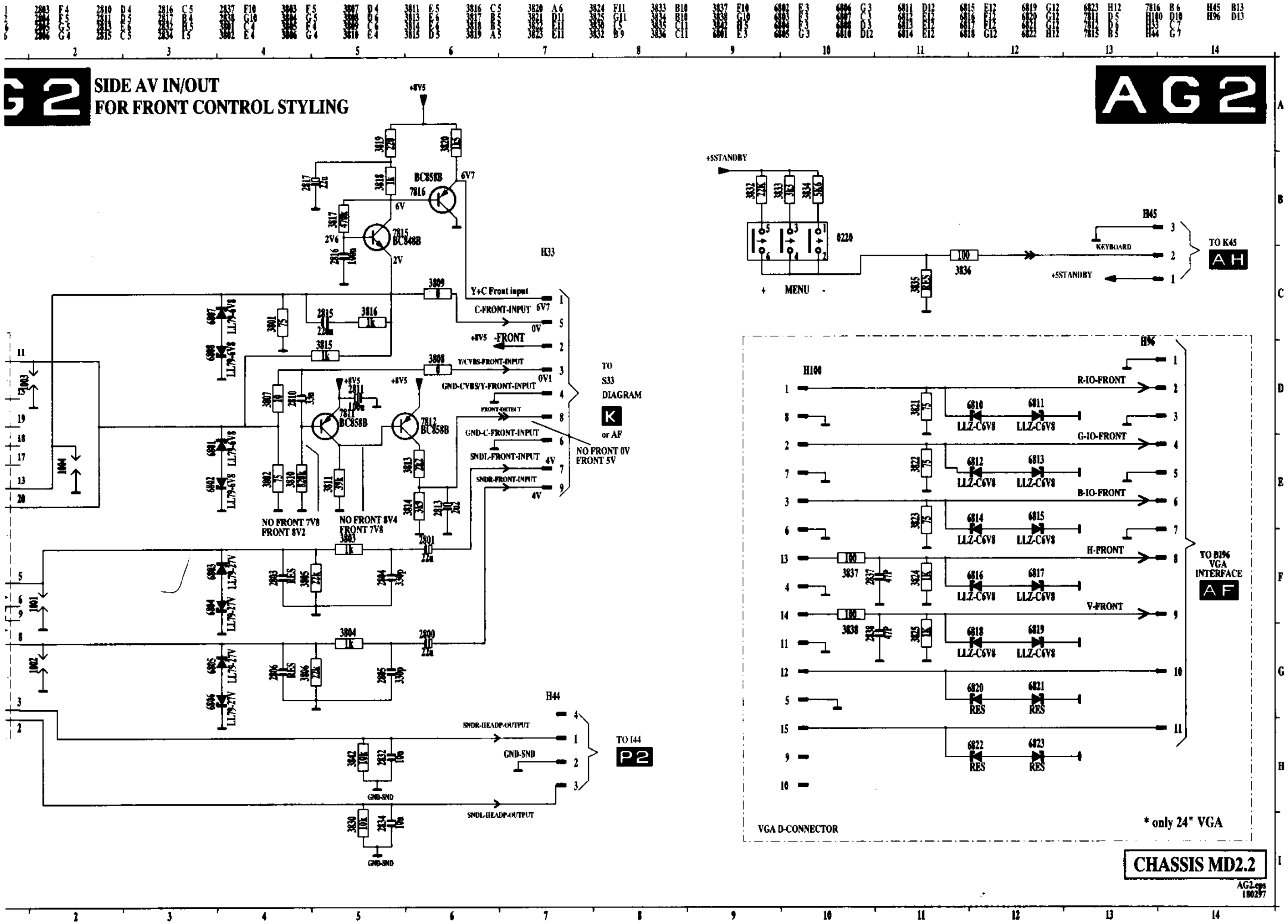
Front input/output panel (top control styling) / Fronteingangs-/Ausgangsplatine / Platine frontale entrée/sortie

0220	I 4	2800	F 6	2810	D 5	2832	H 6	3634	J 5	3806	G 5	3813	D 6	3819	A 6	6803	F 4	7811	D 5	H44	G 7
0226	C 1	2801	E 6	2811	D 5	2834	H 6	3801	C 4	3807	D 4	3814	E 6	3820	A 6	6804	F 4	7812	D 6		
1001	F 2	2803	F 4	2813	E 6	3630	I 3	3802	E 4	3808	C 6	3815	C 5	3830	H 5	6805	G 4	7815	B 6		
1002	G 2	2804	F 6	2815	C 5	3631	I 3	3803	E 5	3809	C 6	3816	C 5	3842	H 5	6806	G 4	7816	B 6		
1003	D 2	2805	G 6	2816	B 5	3632	I 4	3804	F 5	3810	E 5	3817	B 5	6801	D 4	6807	C 4	B45	J 7		
1004	D 2	2806	G 4	2817	A 5	3633	J 5	3805	F 5	3811	E 5	3818	A 6	6802	E 4	6808	C 4	H33	B 7		


AG
SIDE AV IN/OUT
FOR FRONT CONTROL STYLING
AG
+8V5
3819 220
3820 1K5
2817 22u
3818 1k
6V7
6V
7816 BC858B
3817 470k
2V6
7815 BC848B
2816 100n
2V
H33
3809 0
6V7
C-FRONT-INPUT
0V
+8V5 -FRONT
3801 75
2815 220n
3816 1k
3815 1k
3808 0
Y/CVBS-FRONT-INPUT
0V1
GND-CVBS/Y-FRONT-INPUT
+8V5
2811 100u
+8V5
7811 BC858B
7812 BC858B
3807 10
2810 33n
FRONT-DETECT
GND-C-FRONT-INPUT
SNDL-FRONT-INPUT
4V
SNDR-FRONT-INPUT
4V
TO S33 DIAGRAM
K
3802 75
3810 820K
3811 39K
3813 2K2
3814 3K9
2813 2u2
NO FRONT 8V4 FRONT 7V8
NO FRONT 8V4 FRONT 7V8
3803 1k
2801 22u
0226
CVBS
LEFT
RIGHT
SVHS
HP
R
L
GND-SND
1001
1002
1003
1004
6807 LL79-6V8
6808 LL79-6V8
6801 LL79-6V8
6802 LL79-6V8
6803 LL79-27V
6804 LL79-27V
6805 LL79-27V
6806 LL79-27V
2803 RES
3805 22k
2804 330p
3804 1k
2800 22u
2806 RES
3806 22k
2805 330p
H44
SNDR-HEADP-OUTPUT
GND-SND
TO I44
P2
3842 10K
2832 10n
GND-SND
SNDL-HEADP-OUTPUT
3830 10K
2834 10n
GND-SND
+5STANDBY
3630 3K3
3631 5K6
3632 22K
0106
0105
0104
0220
MENU
-
+
100
3634
3633 RES
KEYBOARD
0V-5V
+5STANDBY
4V8
B45
AMP B-type
TO K45
AH
CHASSIS MD2.2
AG.eps 180297


CVBS
SVHS
LEFT
RIGHT
GND-SND

Front input/output panel with VGA input (front control styling) / Fronteingangs-/Ausgangsplatine mit VGA-Eingang / Platine frontale entrée/sortie avec entrée VGA


AG2
SIDE AV IN/OUT
FOR FRONT CONTROL STYLING
+8V5
BC858B
7816
7815
BC848B
6V7
6V
2V6
2V
H33
Y+C Front input
C-FRONT-INPUT
-FRONT
Y/CVBS-FRONT-INPUT
GND-CVBS/Y-FRONT-INPUT
FRONT-DETECT
GND-C-FRONT-INPUT
SNDL-FRONT-INPUT
SNDR-FRONT-INPUT
TO S33 DIAGRAM
K
or AF
NO FRONT 0V
FRONT 5V
NO FRONT 7V8
FRONT 8V2
NO FRONT 8V4
FRONT 7V8
7811
BC858B
7812
BC858B
LL79-6V8
LL79-27V
H44
SNDR-HEADP-OUTPUT
GND-SND
SNDL-HEADP-OUTPUT
TO I44
P2
+5STANDBY
0220
MENU
H45
KEYBOARD
+5STANDBY
TO K45
AH
H96
H100
R-IO-FRONT
G-IO-FRONT
B-IO-FRONT
H-FRONT
V-FRONT
LLZ-C6V8
RES
TO B196 VGA INTERFACE
AF
VGA D-CONNECTOR
* only 24" VGA
CHASSIS MD2.2
AG2.eps
180297

220 A 5
226 A 1
800 A 2
801 A 2
803 A 1
2804 A 1
2805 A 2
2806 A 2
2810 A 2
2811 A 2
2813 A 3
2815 A 2
2816 A 3
2817 A 3
2832 A 1
2834 A 1
2837 A 4
2838 A 4
3801 A 2
3802 A 3
3803 A 1
3804 A 1
3805 A 1
3806 A 2
3807 A 2
3808 A 4
3809 A 3
3810 A 2
3811 A 2
3813 A 3
3814 A 3
3815 A 2
3816 A 2
3817 A 3
3818 A 3
3819 A 3
3820 A 3
3821 A 5
3822 A 4
3823 A 4
3824 A 5
3825 A 5
3830 A 1
3832 A 5
3833 A 5
3834 A 5
3835 A 5
3836 A 5
3837 A 4
3838 A 4
3842 A 1
3999 A 5
6801 A 2
6802 A 2
6803 A 1
6804 A 1
6805 A 1
6806 A 1
6807 A 2
6808 A 2
6810 A 4
6811 A 4
6812 A 4
6813 A 4
6814 A 4
6815 A 4
6816 A 5
6817 A 5
6818 A 5
6819 A 5
6820 A 4
6821 A 4
6822 A 4
6823 A 3
7811 A 2
7812 A 2
7815 A 3
7816 A 4
H33 A 3
H44 A 1
H45 A 5
H96 A 5
H100 A 4

5 4 3 2 1